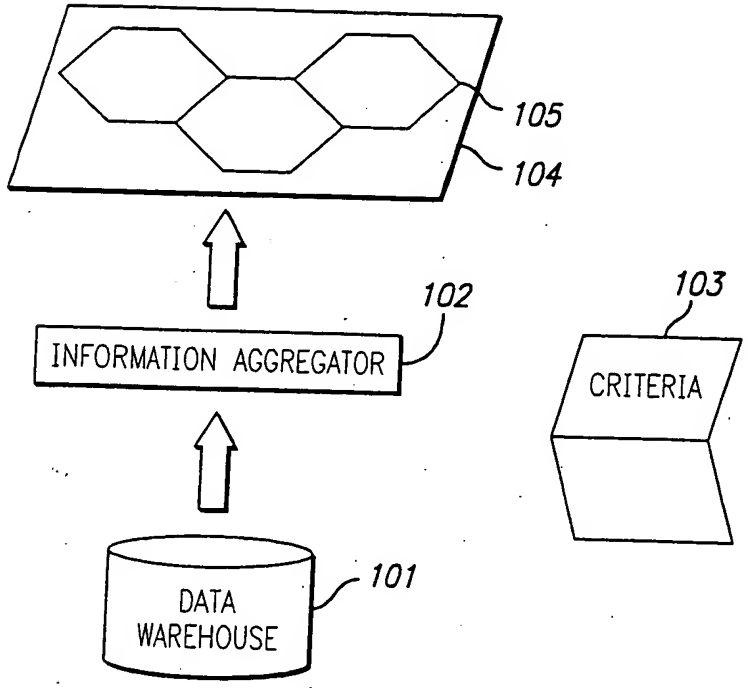

105
104
102
INFORMATION AGGREGATOR
103
CRITERIA
DATA WAREHOUSE
101

FIG. 1A

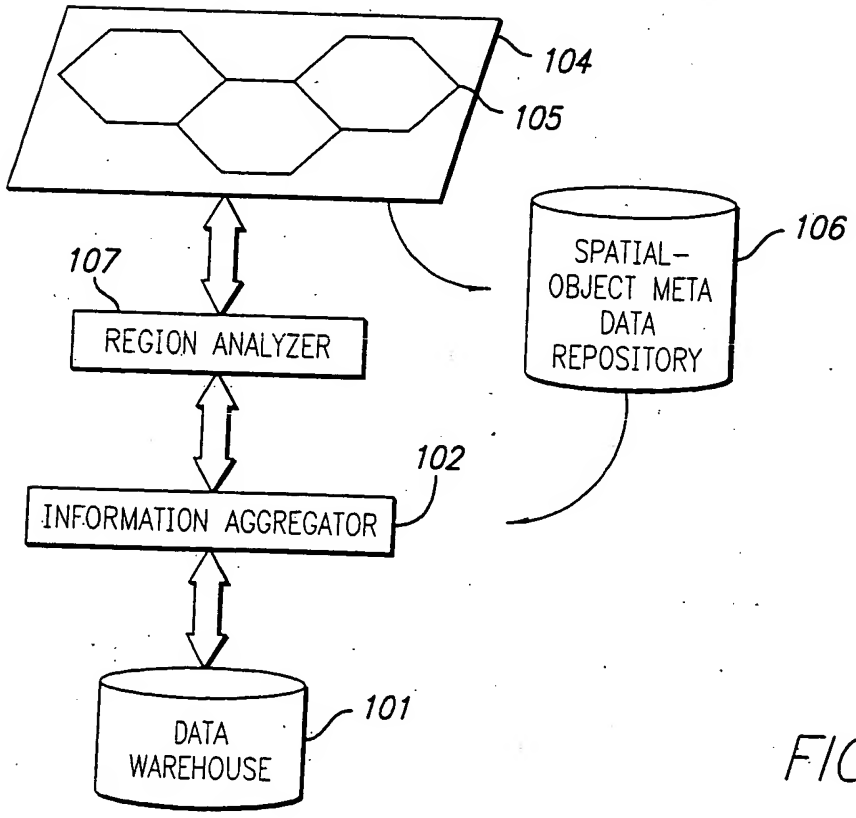

104
105
107
REGION ANALYZER
SPATIAL–OBJECT META DATA REPOSITORY
106
102
INFORMATION AGGREGATOR
DATA WAREHOUSE
101

FIG. 1B

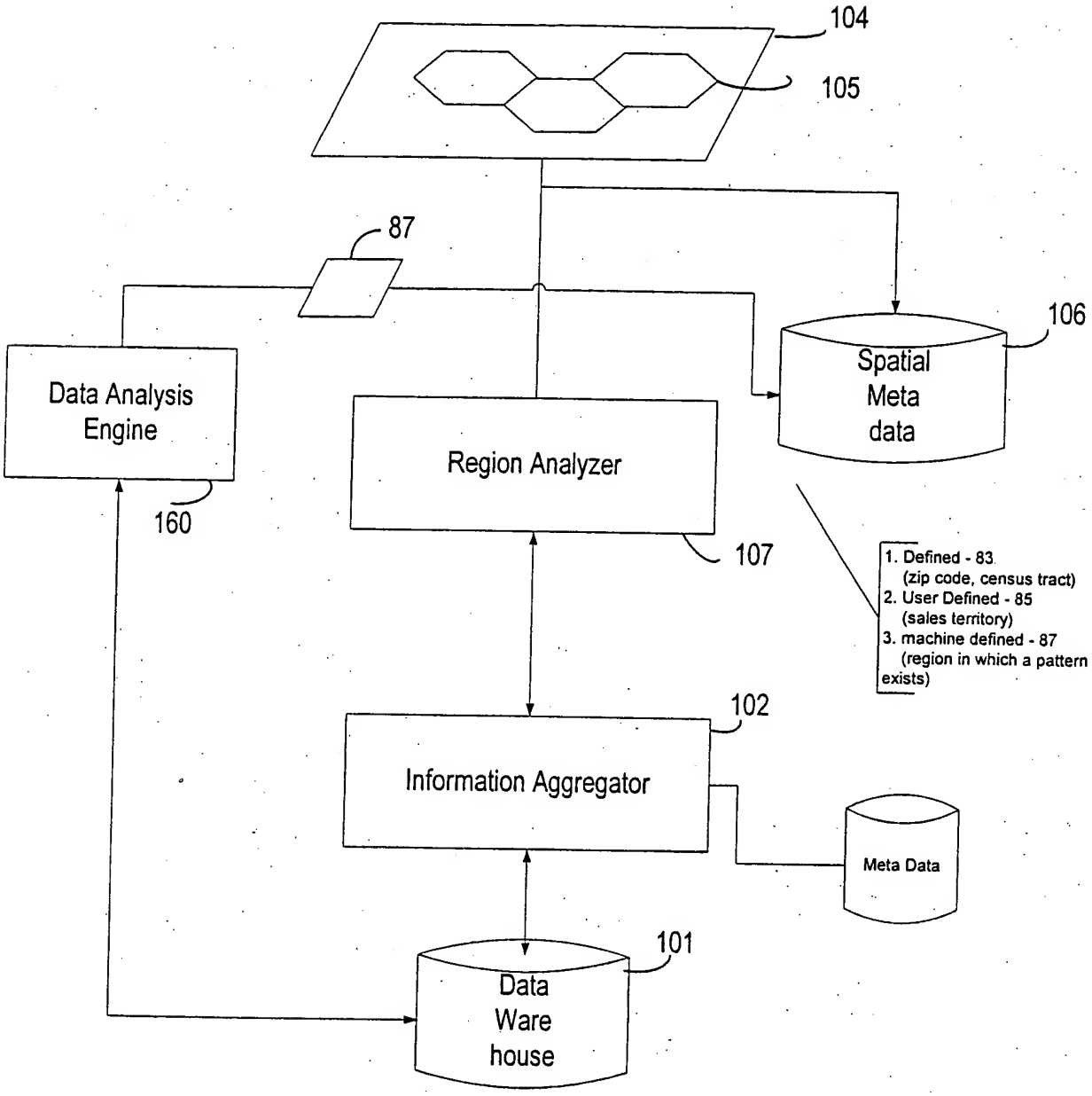
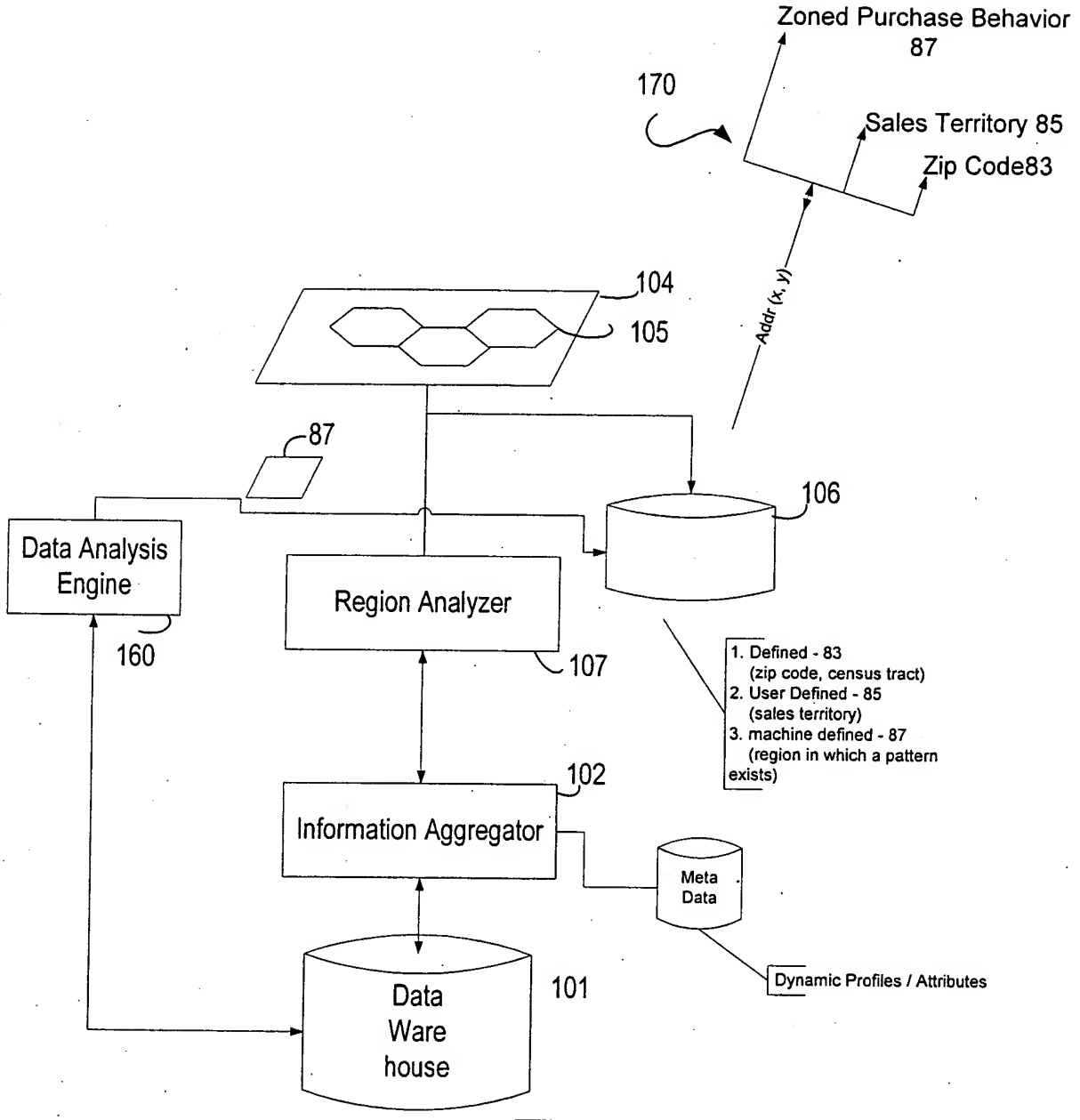

104
105
87
106
Data Analysis Engine
Region Analyzer
Spatial Meta data
160
107
1. Defined - 83 (zip code, census tract)
2. User Defined - 85 (sales territory)
3. machine defined - 87 (region in which a pattern exists)
102
Information Aggregator
Meta Data
101
Data Ware house

Fig. 1C



Customer ID	Addr	Income	Purchase Amt

Fig. 1D

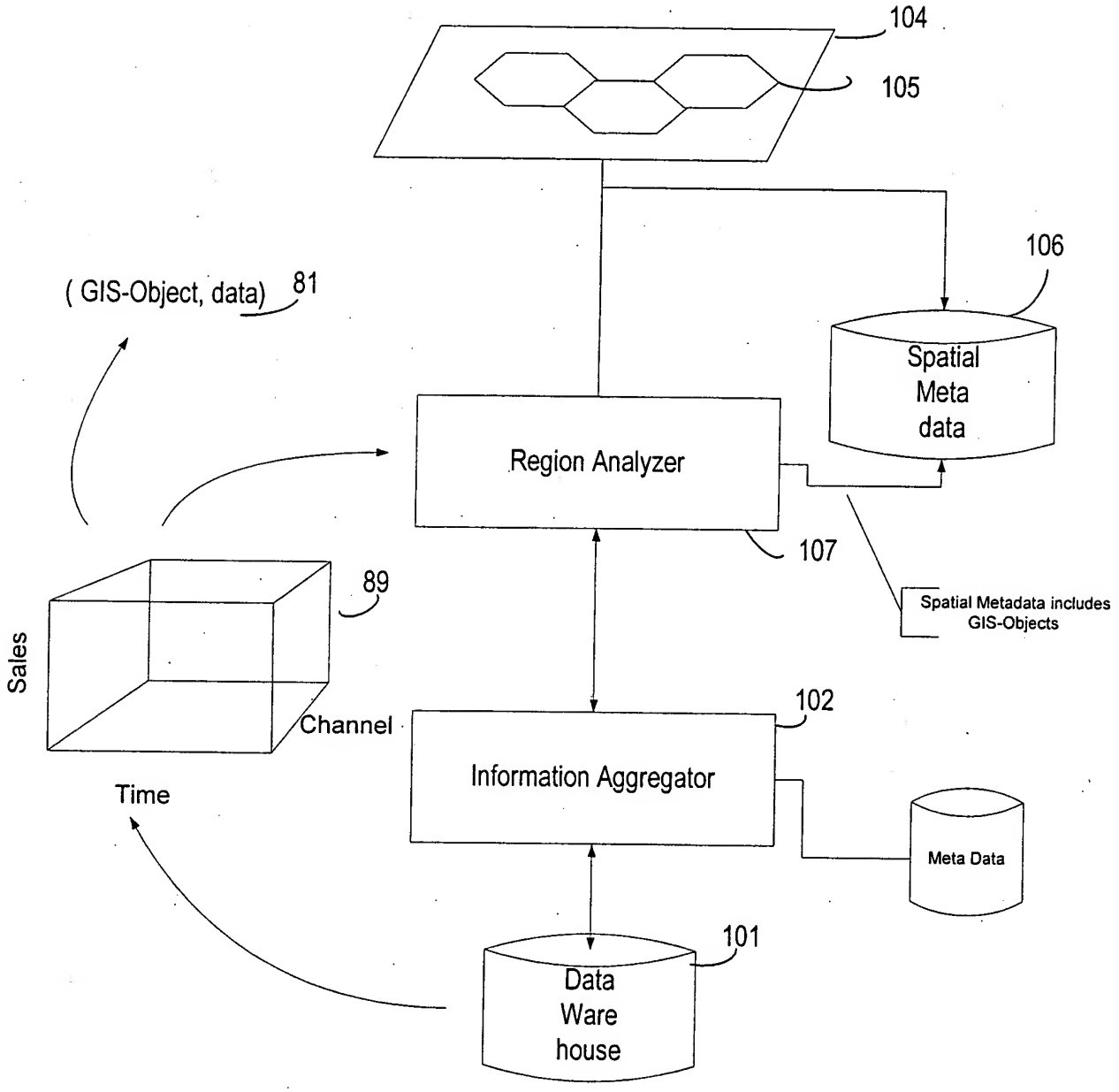

104
105
106
(GIS-Object, data)
81
Spatial
Meta
data
Region Analyzer
107
Spatial Metadata includes
GIS-Objects
89
Sales
Channel
102
Information Aggregator
Time
Meta Data
101
Data
Ware
house

Fig. 1E

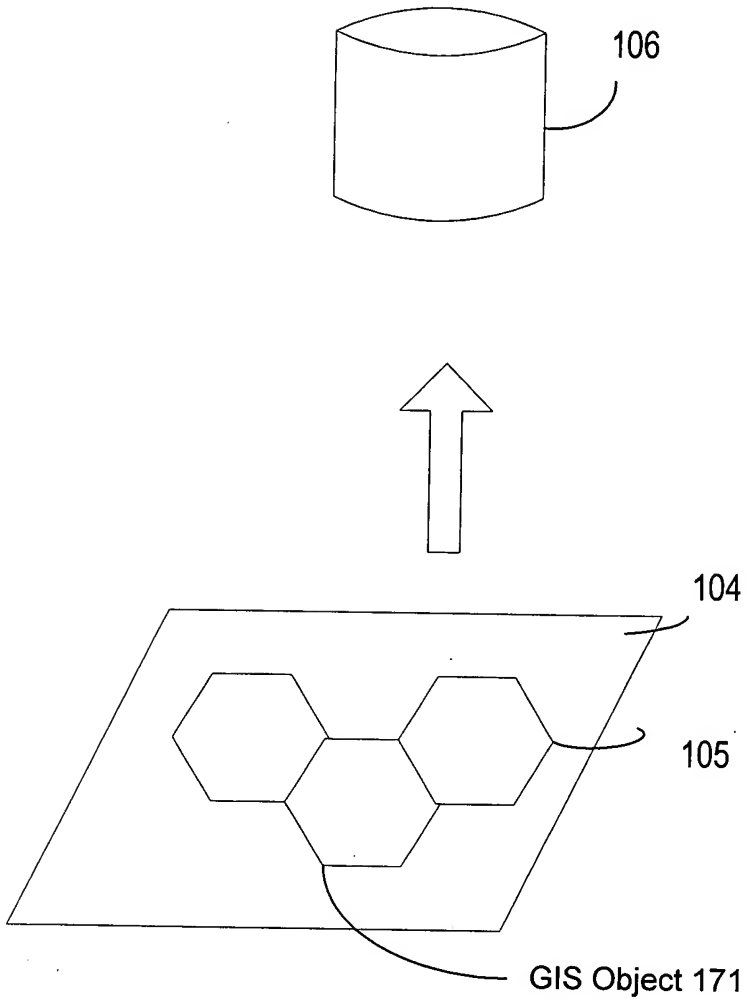


Fig. 1F

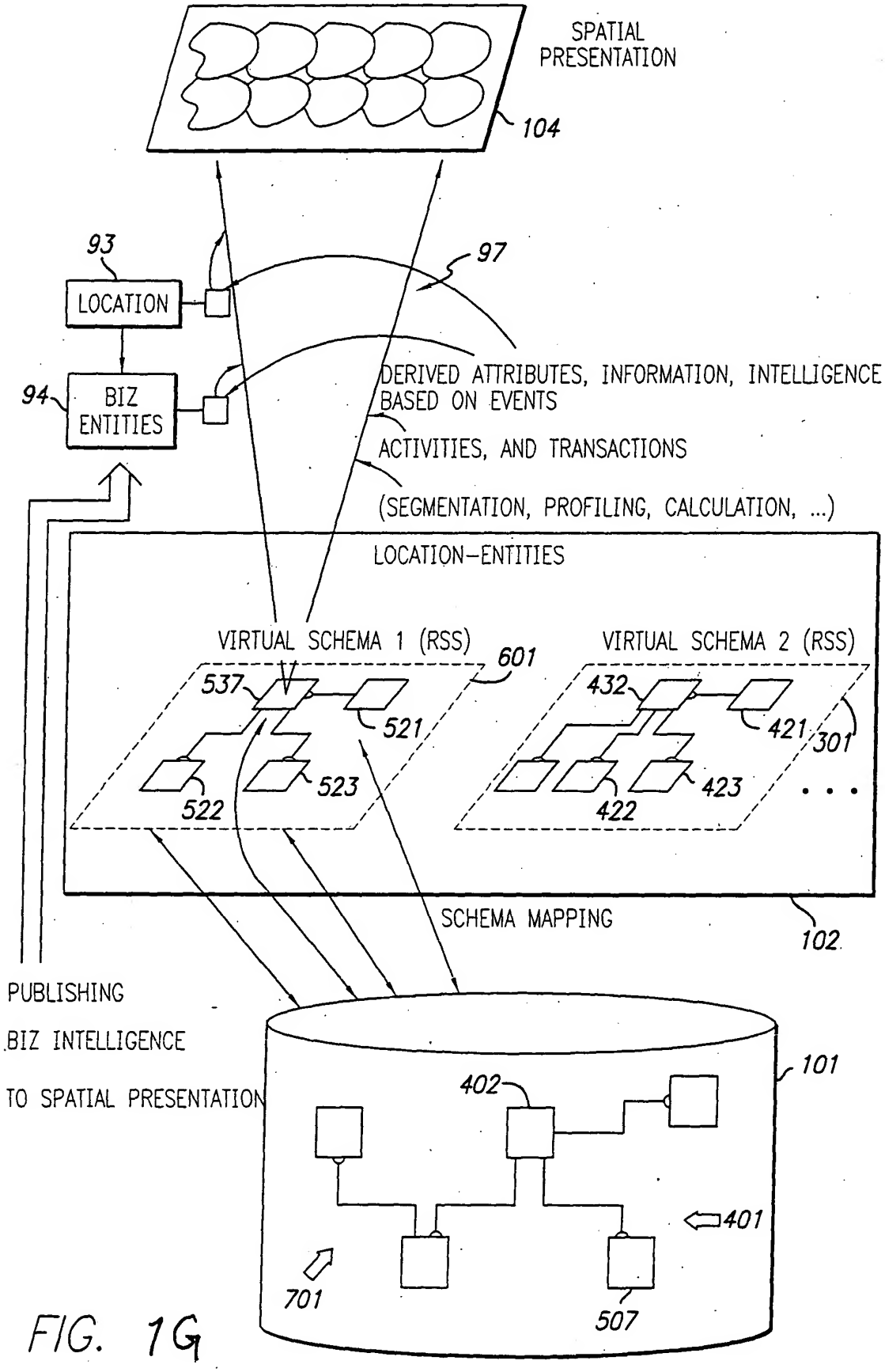

SPATIAL PRESENTATION
104
93
LOCATION
97
94
BIZ ENTITIES
DERIVED ATTRIBUTES, INFORMATION, INTELLIGENCE BASED ON EVENTS
ACTIVITIES, AND TRANSACTIONS
(SEGMENTATION, PROFILING, CALCULATION, ...)
LOCATION–ENTITIES
VIRTUAL SCHEMA 1 (RSS)
601
537
521
522
523
VIRTUAL SCHEMA 2 (RSS)
432
421
301
422
423
SCHEMA MAPPING
102
PUBLISHING
BIZ INTELLIGENCE
TO SPATIAL PRESENTATION
101
402
401
701
507

FIG. 1G

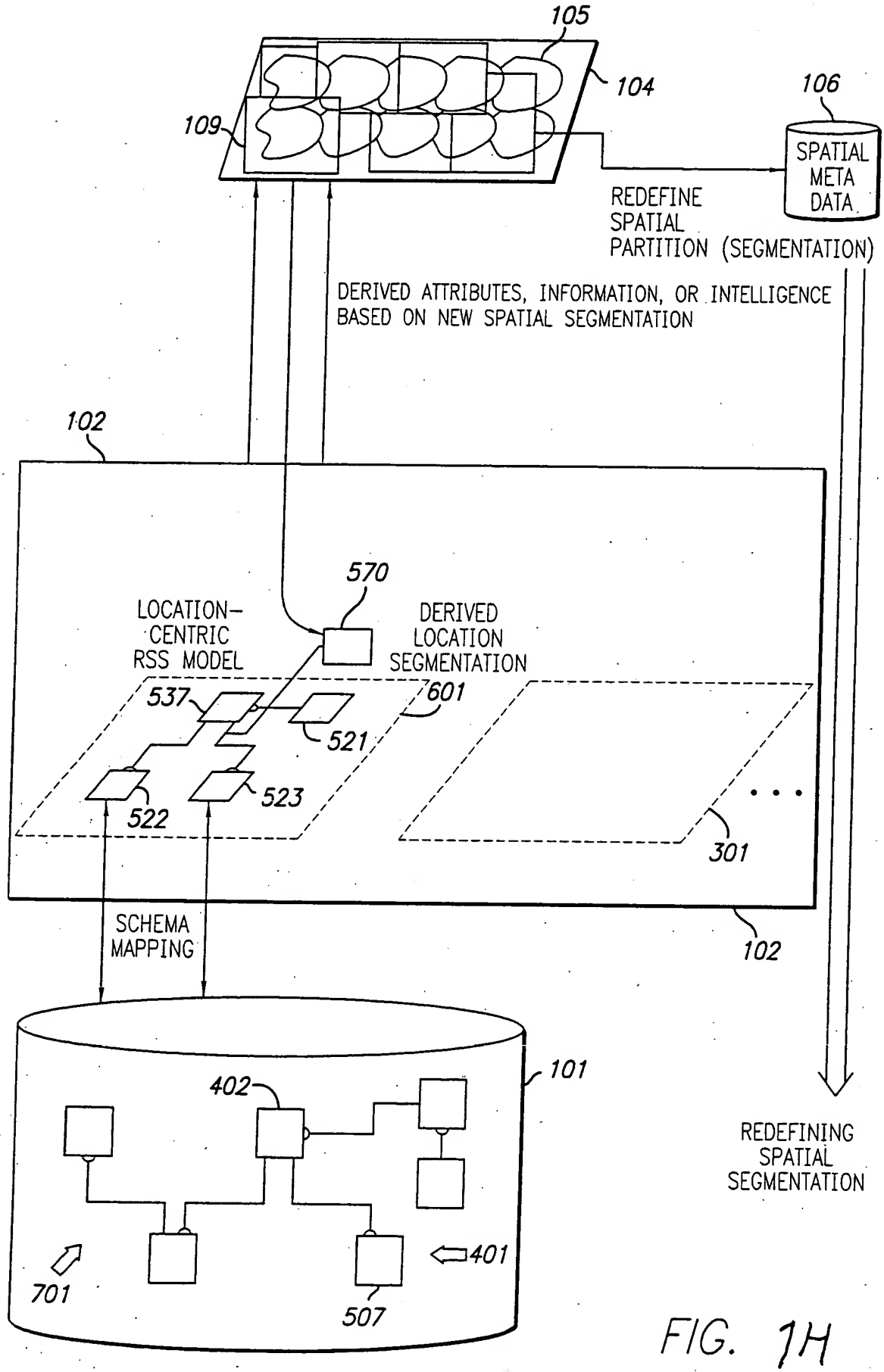

105
104
106
109
SPATIAL META DATA
REDEFINE SPATIAL PARTITION (SEGMENTATION)
DERIVED ATTRIBUTES, INFORMATION, OR INTELLIGENCE BASED ON NEW SPATIAL SEGMENTATION
102
570
LOCATION-CENTRIC RSS MODEL
DERIVED LOCATION SEGMENTATION
537
601
521
522
523
301
102
SCHEMA MAPPING
101
402
401
701
507
REDEFINING SPATIAL SEGMENTATION

FIG. 1H

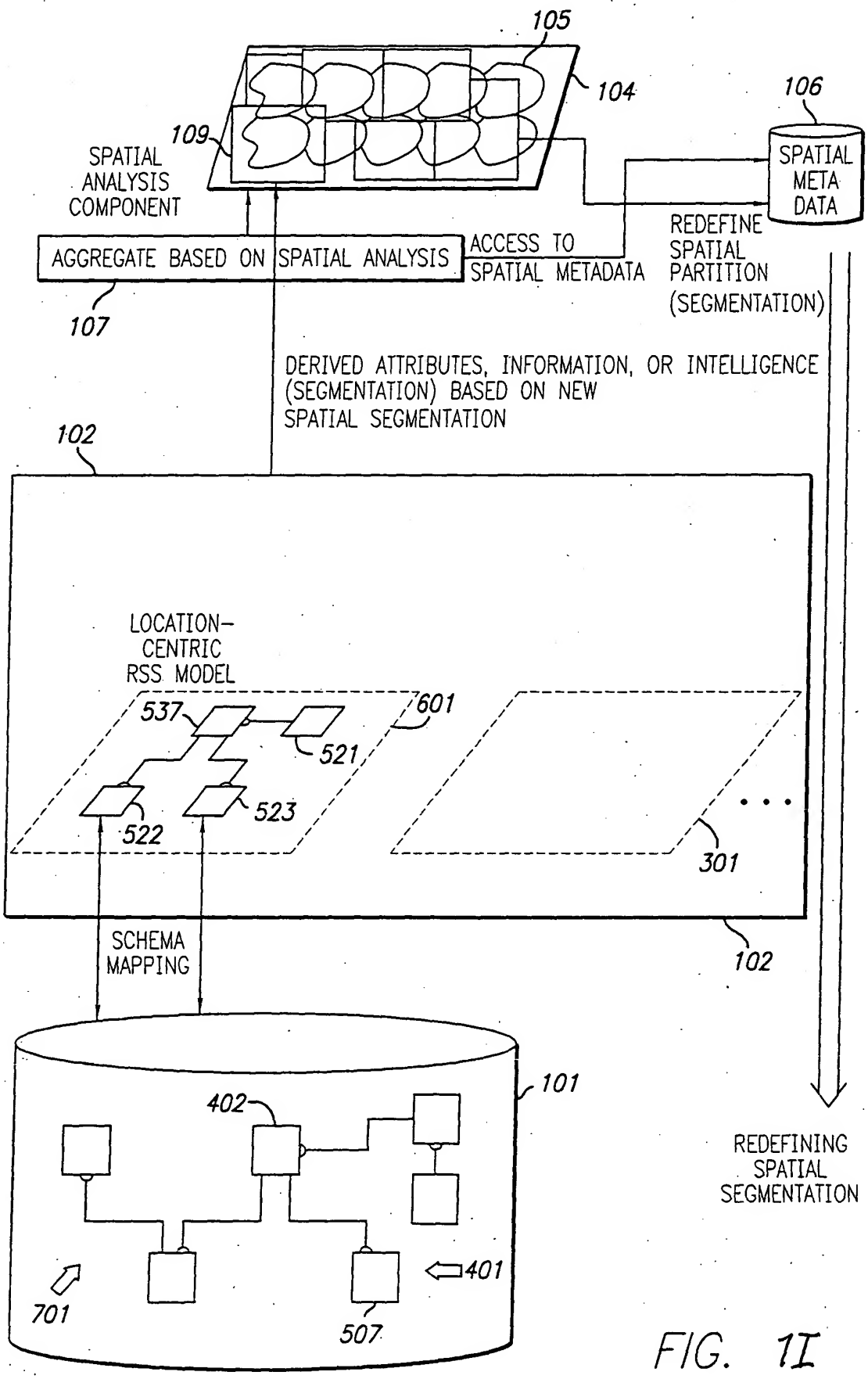

105
104
106
109
SPATIAL ANALYSIS COMPONENT
SPATIAL META DATA
AGGREGATE BASED ON SPATIAL ANALYSIS
ACCESS TO SPATIAL METADATA
REDEFINE SPATIAL PARTITION (SEGMENTATION)
107
DERIVED ATTRIBUTES, INFORMATION, OR INTELLIGENCE (SEGMENTATION) BASED ON NEW SPATIAL SEGMENTATION
102
LOCATION-CENTRIC RSS MODEL
537
601
521
522
523
301
SCHEMA MAPPING
102
101
402
401
701
507
REDEFINING SPATIAL SEGMENTATION

FIG. 1I

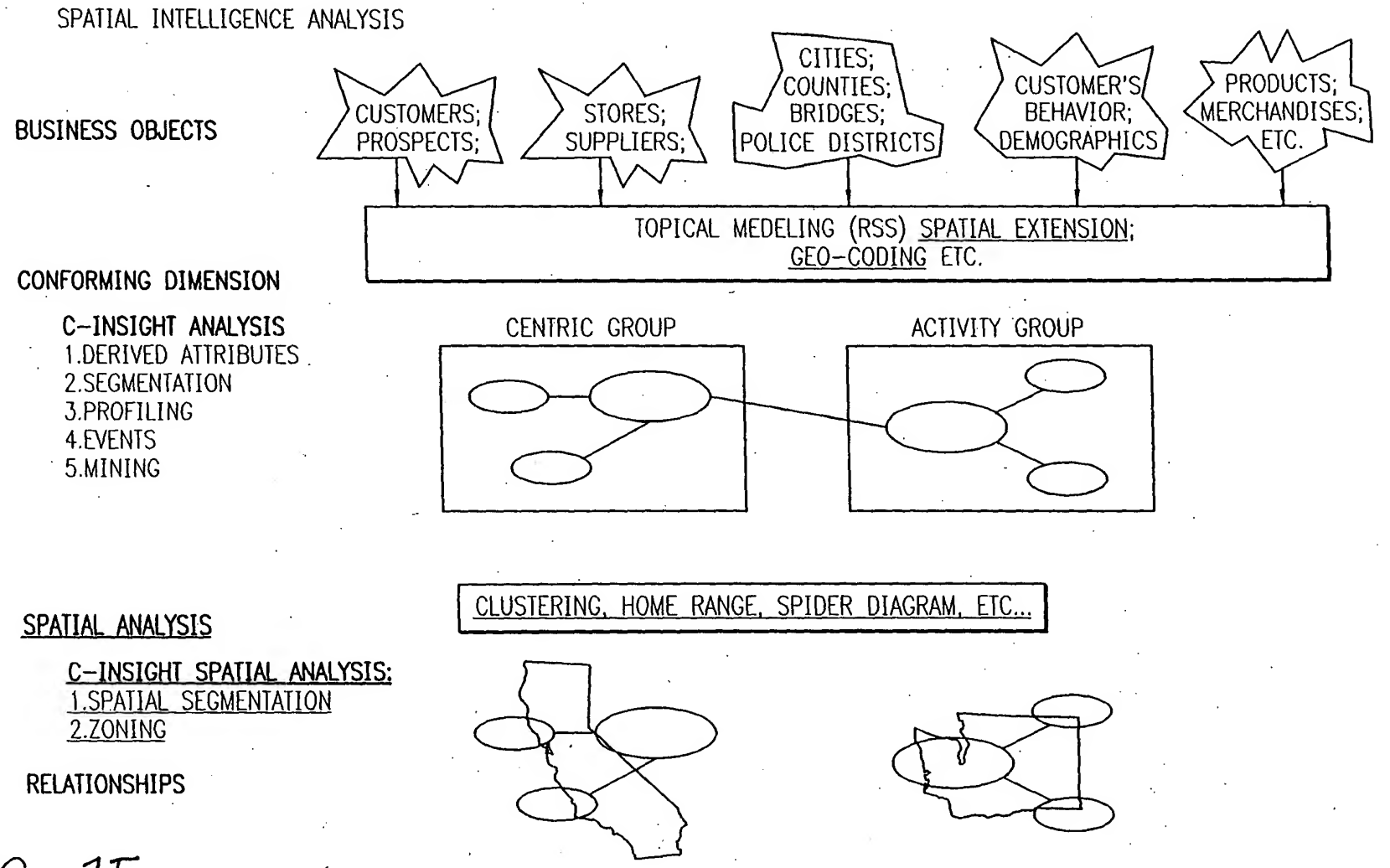

SPATIAL INTELLIGENCE ANALYSIS
BUSINESS OBJECTS
CUSTOMERS; PROSPECTS;
STORES; SUPPLIERS;
CITIES; COUNTIES; BRIDGES; POLICE DISTRICTS
CUSTOMER'S BEHAVIOR; DEMOGRAPHICS
PRODUCTS; MERCHANDISES; ETC.
TOPICAL MEDELING (RSS) SPATIAL EXTENSION; GEO-CODING ETC.
CONFORMING DIMENSION
C-INSIGHT ANALYSIS
1.DERIVED ATTRIBUTES
2.SEGMENTATION
3.PROFILING
4.EVENTS
5.MINING
CENTRIC GROUP
ACTIVITY GROUP
CLUSTERING, HOME RANGE, SPIDER DIAGRAM, ETC...
SPATIAL ANALYSIS
C-INSIGHT SPATIAL ANALYSIS:
1.SPATIAL SEGMENTATION
2.ZONING
RELATIONSHIPS

FIG. 1J

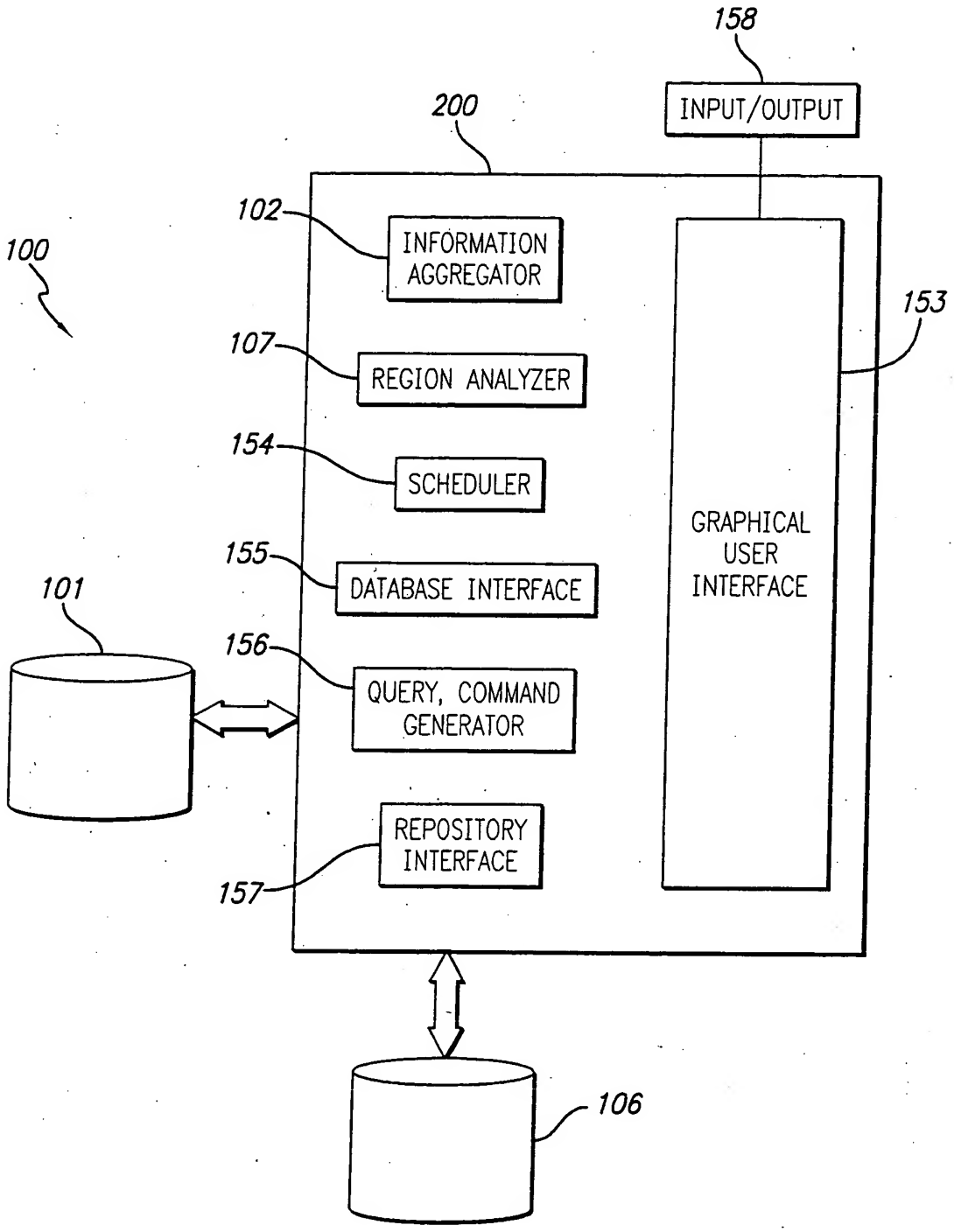

158
INPUT/OUTPUT
200
102
INFORMATION AGGREGATOR
100
153
107
REGION ANALYZER
154
SCHEDULER
GRAPHICAL USER INTERFACE
155
DATABASE INTERFACE
101
156
QUERY, COMMAND GENERATOR
REPOSITORY INTERFACE
157
106

FIG. 2A

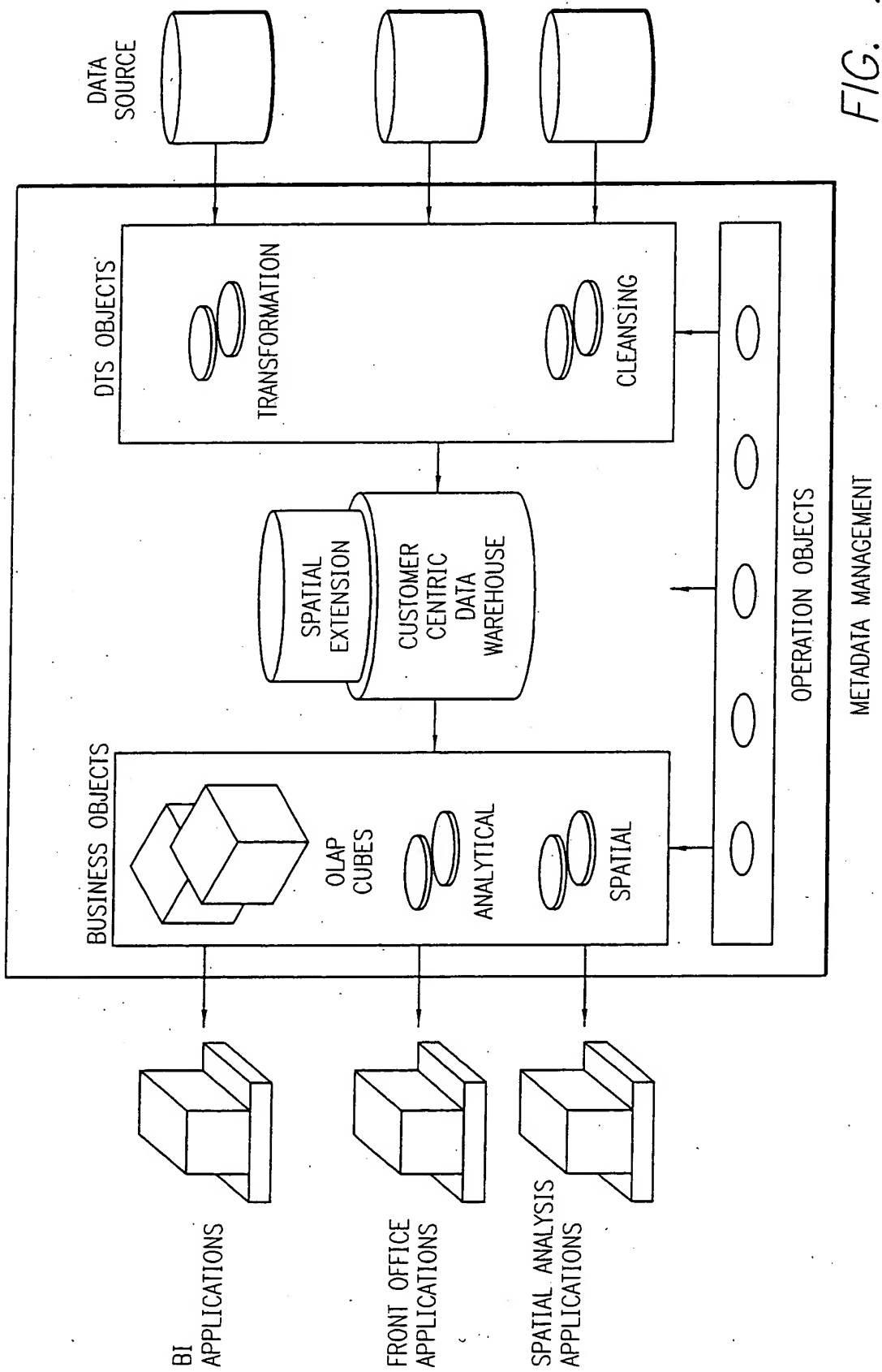

DATA SOURCE
DTS OBJECTS
TRANSFORMATION
CLEANSING
SPATIAL EXTENSION
CUSTOMER CENTRIC DATA WAREHOUSE
BUSINESS OBJECTS
OLAP CUBES
ANALYTICAL
SPATIAL
OPERATION OBJECTS
METADATA MANAGEMENT
BI APPLICATIONS
FRONT OFFICE APPLICATIONS
SPATIAL ANALYSIS APPLICATIONS

FIG. 2B

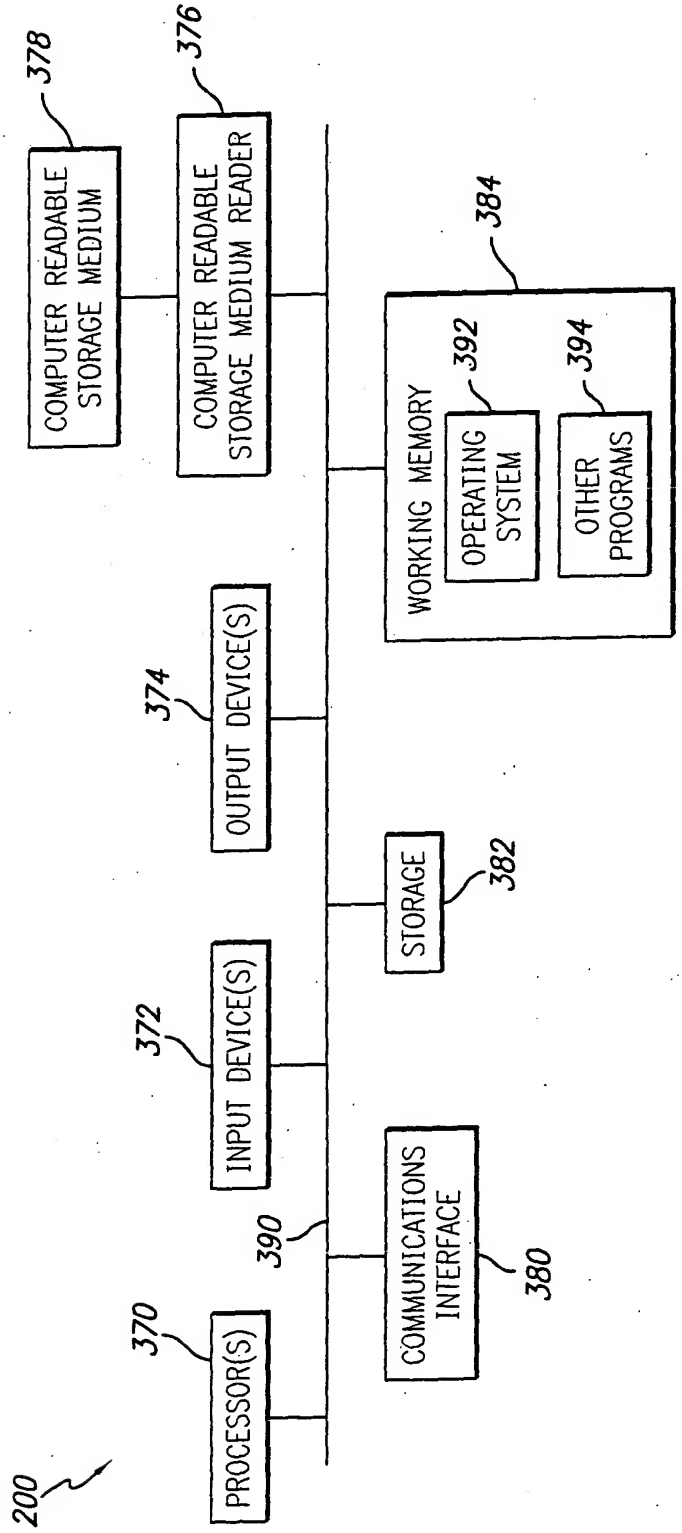

200
PROCESSOR(S)
370
COMMUNICATIONS INTERFACE
380
390
INPUT DEVICE(S)
372
STORAGE
382
OUTPUT DEVICE(S)
374
WORKING MEMORY
384
OPERATING SYSTEM
392
OTHER PROGRAMS
394
COMPUTER READABLE STORAGE MEDIUM READER
376
COMPUTER READABLE STORAGE MEDIUM
378

FIG. 3

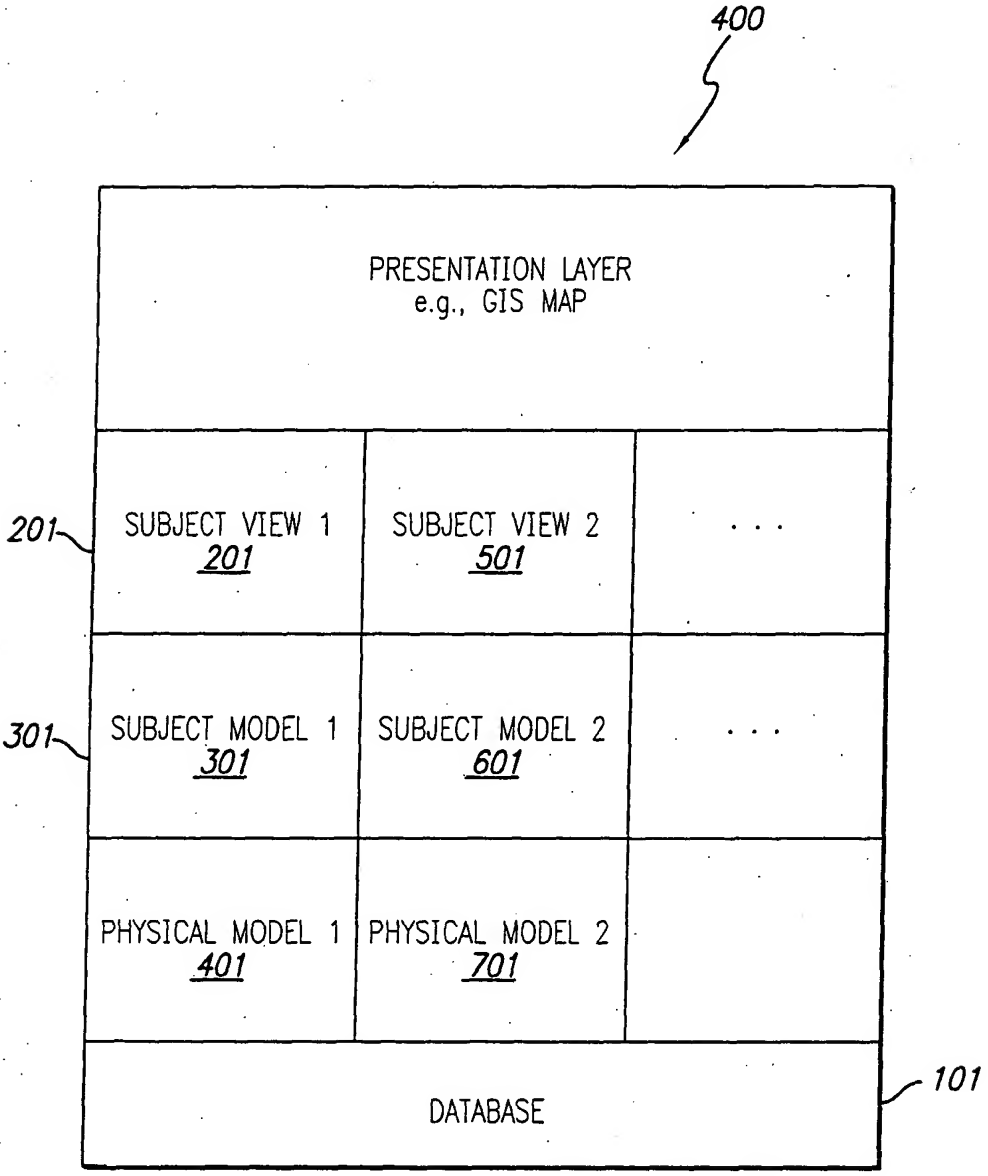

400
PRESENTATION LAYER
e.g., GIS MAP
201
SUBJECT VIEW 1
201
SUBJECT VIEW 2
501
. . .
301
SUBJECT MODEL 1
301
SUBJECT MODEL 2
601
. . .
PHYSICAL MODEL 1
401
PHYSICAL MODEL 2
701
DATABASE
101

FIG. 4A

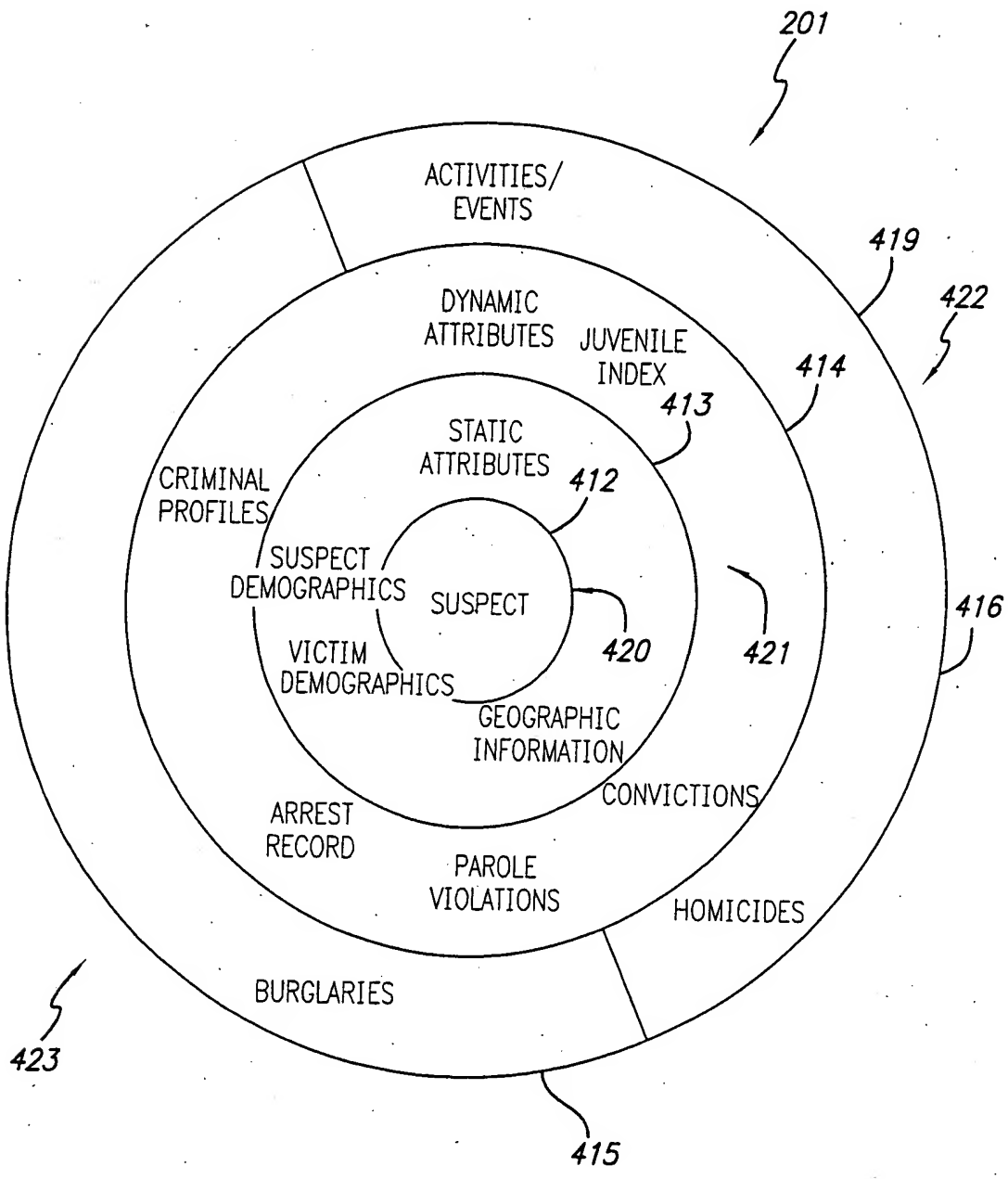

201
ACTIVITIES/
EVENTS
419
422
DYNAMIC
ATTRIBUTES
JUVENILE
INDEX
414
413
STATIC
ATTRIBUTES
412
CRIMINAL
PROFILES
SUSPECT
DEMOGRAPHICS
SUSPECT
420
421
416
VICTIM
DEMOGRAPHICS
GEOGRAPHIC
INFORMATION
CONVICTIONS
ARREST
RECORD
PAROLE
VIOLATIONS
HOMICIDES
BURGLARIES
423
415

FIG. 4B

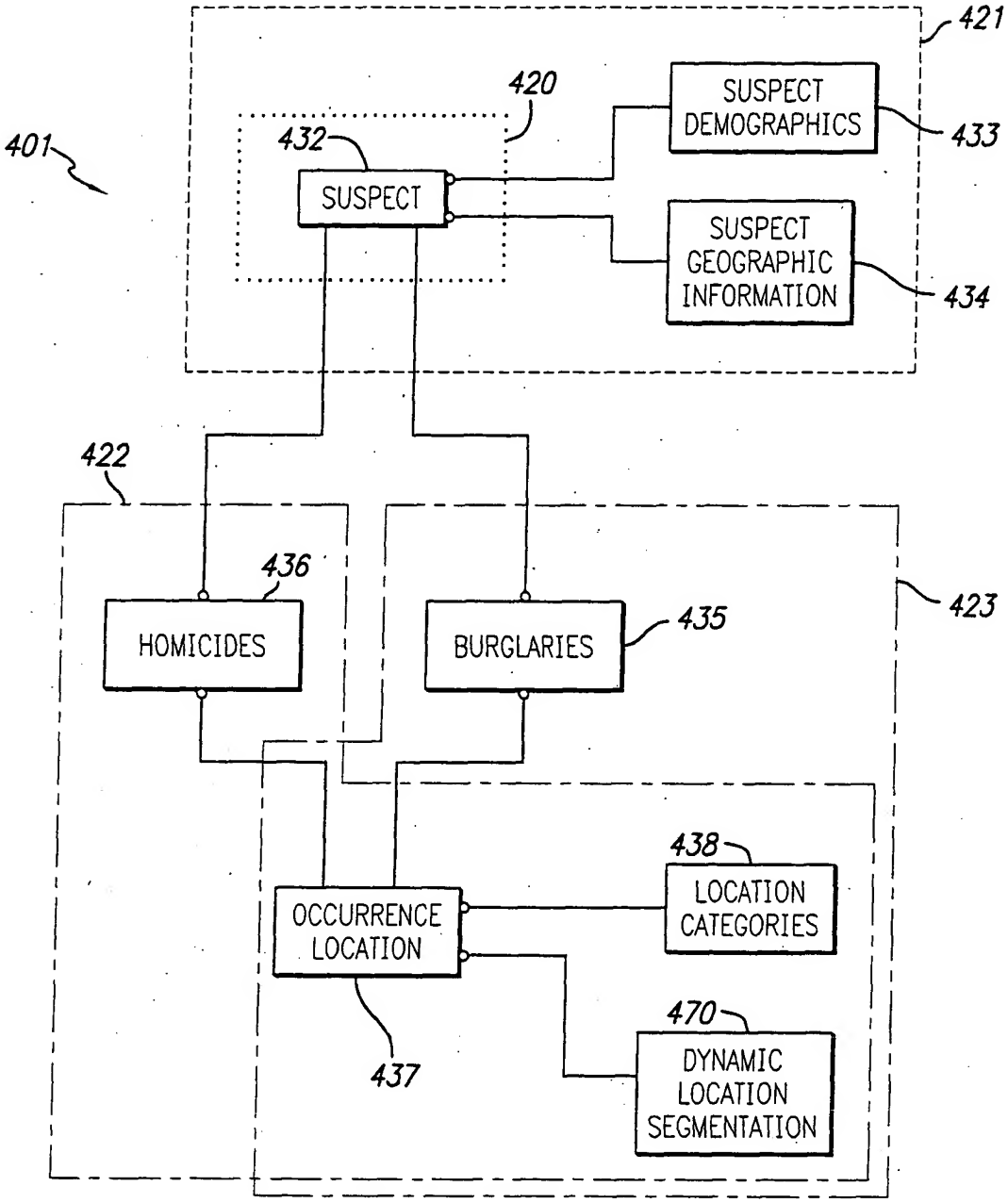

401
421
420
432
SUSPECT
SUSPECT DEMOGRAPHICS
433
SUSPECT GEOGRAPHIC INFORMATION
434
422
423
436
HOMICIDES
BURGLARIES
435
438
LOCATION CATEGORIES
OCCURRENCE LOCATION
437
470
DYNAMIC LOCATION SEGMENTATION

FIG. 4C

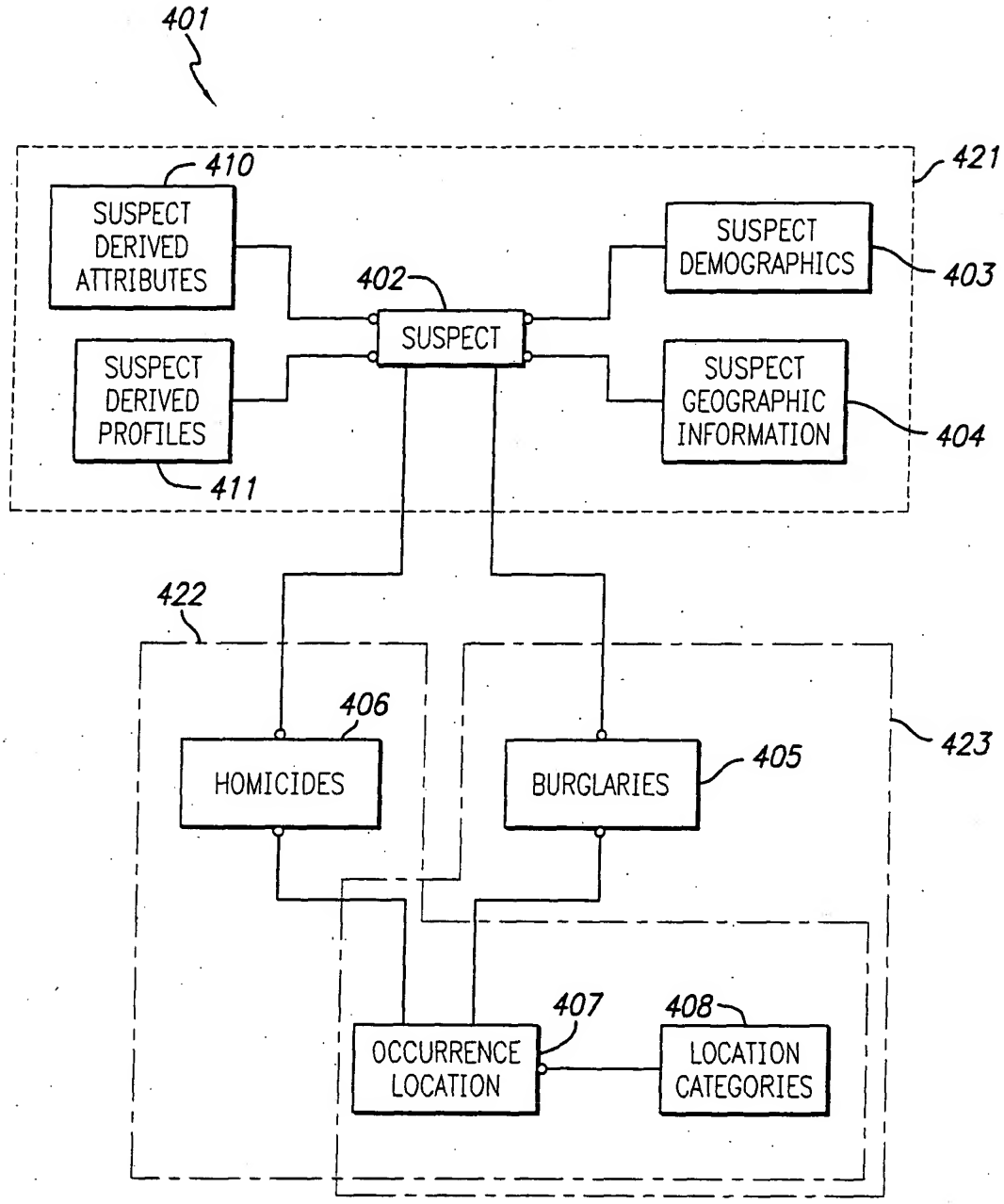

401
410
SUSPECT DERIVED ATTRIBUTES
421
SUSPECT DEMOGRAPHICS
403
402
SUSPECT
SUSPECT DERIVED PROFILES
411
SUSPECT GEOGRAPHIC INFORMATION
404
422
406
HOMICIDES
BURGLARIES
405
423
407
408
OCCURRENCE LOCATION
LOCATION CATEGORIES

FIG. 4D

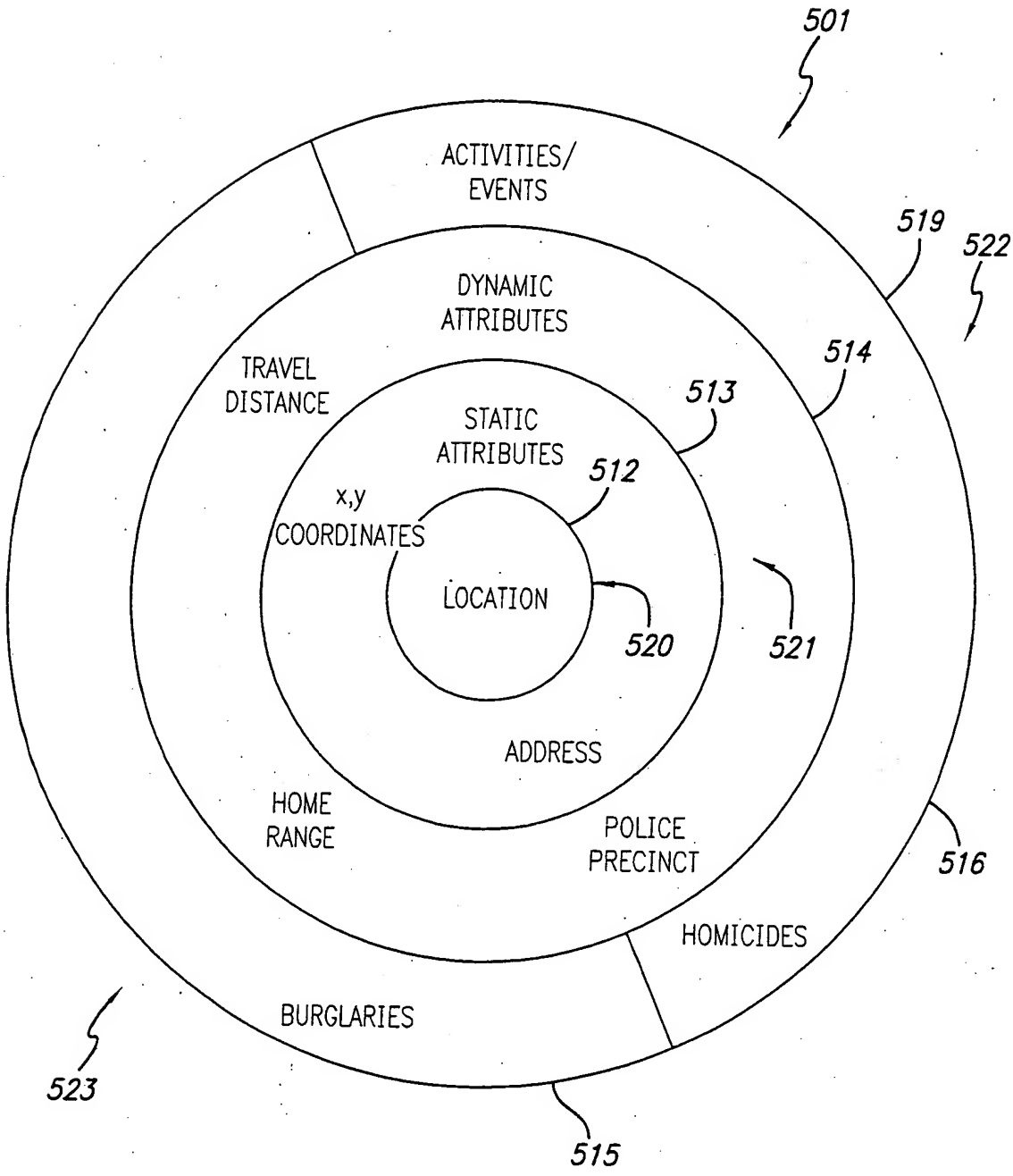

501
ACTIVITIES/
EVENTS
519
522
DYNAMIC
ATTRIBUTES
514
TRAVEL
DISTANCE
513
STATIC
ATTRIBUTES
512
x,y
COORDINATES
LOCATION
520
521
ADDRESS
HOME
RANGE
POLICE
PRECINCT
516
HOMICIDES
BURGLARIES
523
515

FIG. 5A

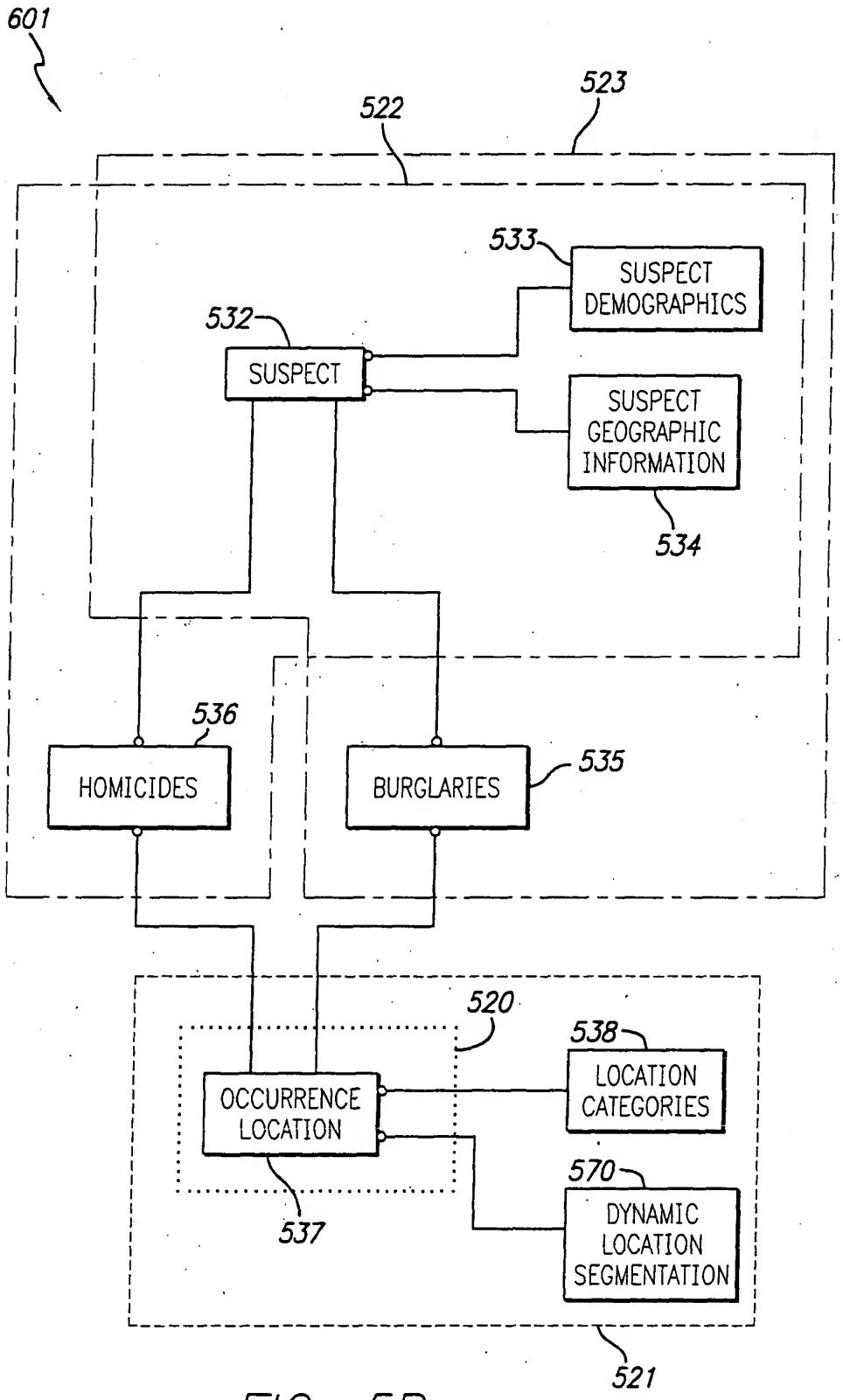

601
522
523
533
SUSPECT DEMOGRAPHICS
532
SUSPECT
SUSPECT GEOGRAPHIC INFORMATION
534
536
HOMICIDES
BURGLARIES
535
520
538
LOCATION CATEGORIES
OCCURRENCE LOCATION
570
DYNAMIC LOCATION SEGMENTATION
537
521

FIG. 5B

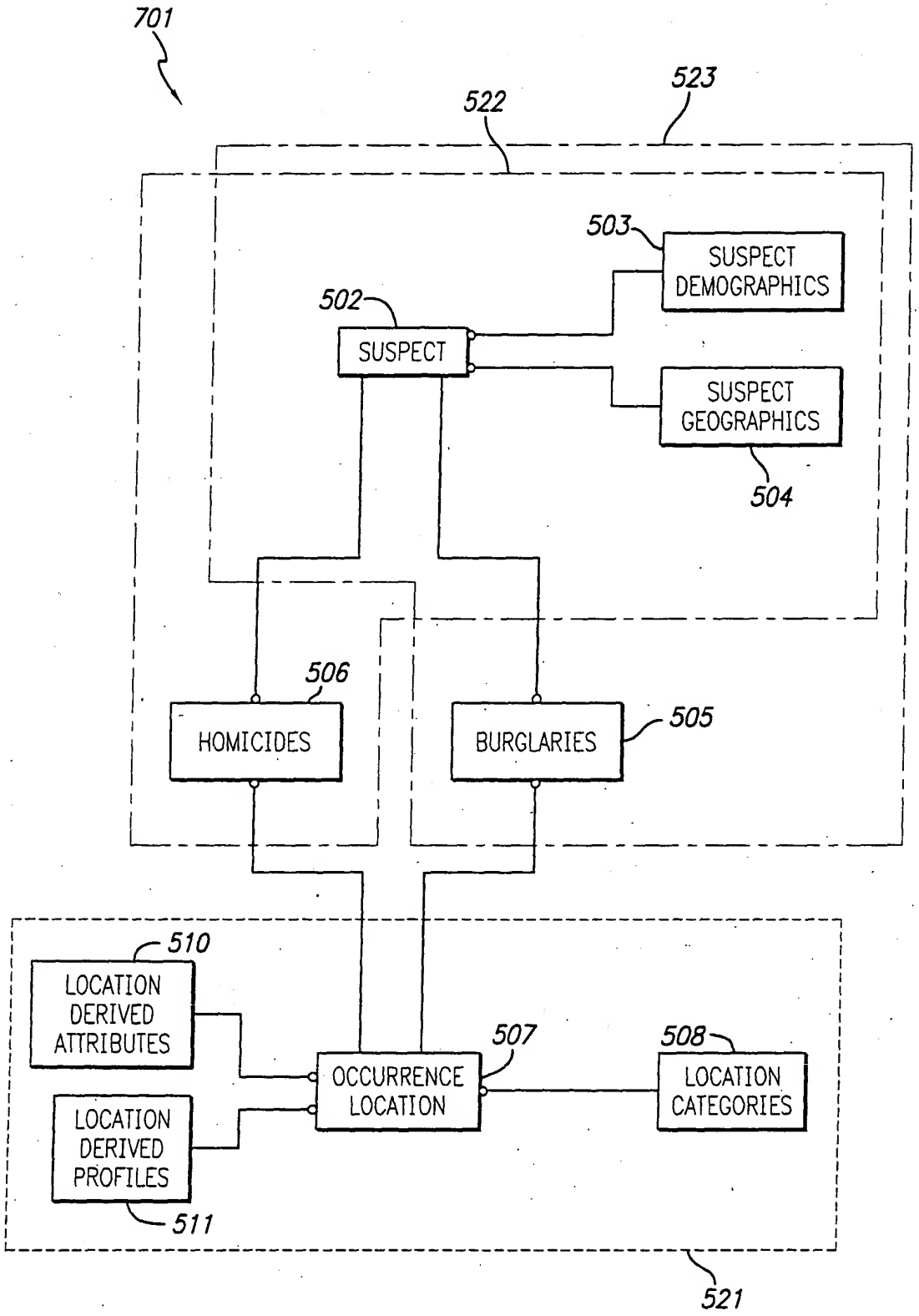

701
523
522
503
SUSPECT DEMOGRAPHICS
502
SUSPECT
SUSPECT GEOGRAPHICS
504
506
HOMICIDES
BURGLARIES
505
510
LOCATION DERIVED ATTRIBUTES
507
508
OCCURRENCE LOCATION
LOCATION CATEGORIES
LOCATION DERIVED PROFILES
511
521

FIG. 5C

FIG. 6A

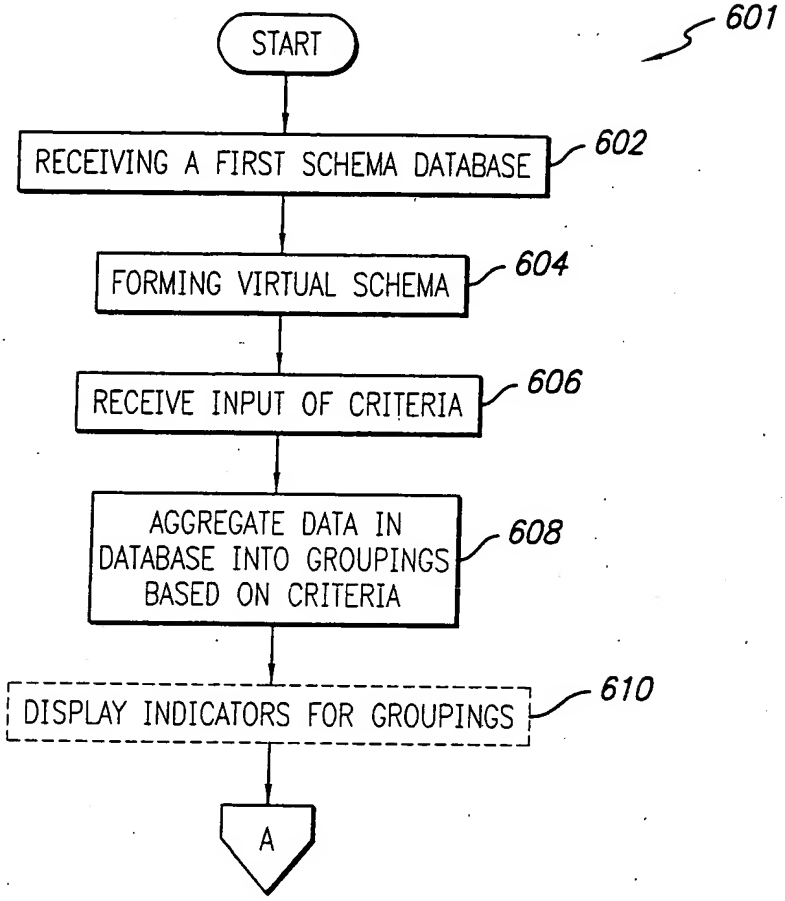

START
601
RECEIVING A FIRST SCHEMA DATABASE
602
FORMING VIRTUAL SCHEMA
604
RECEIVE INPUT OF CRITERIA
606
AGGREGATE DATA IN DATABASE INTO GROUPINGS BASED ON CRITERIA
608
DISPLAY INDICATORS FOR GROUPINGS
610
A

FIG. 6B

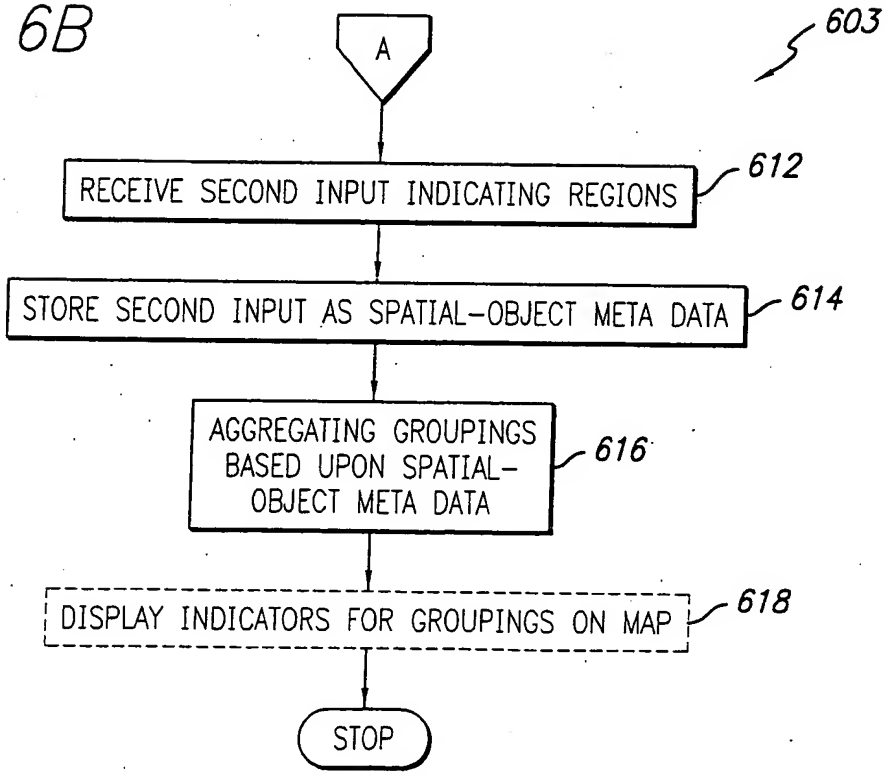

A
603
RECEIVE SECOND INPUT INDICATING REGIONS
612
STORE SECOND INPUT AS SPATIAL-OBJECT META DATA
614
AGGREGATING GROUPINGS BASED UPON SPATIAL-OBJECT META DATA
616
DISPLAY INDICATORS FOR GROUPINGS ON MAP
618
STOP

FIG. 6C

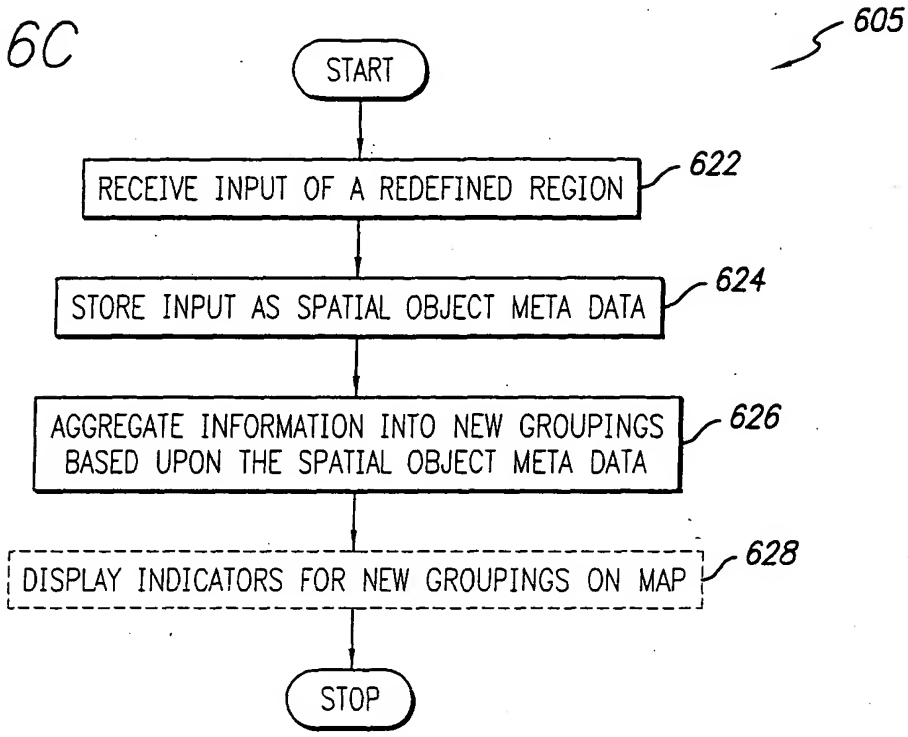

605
START
RECEIVE INPUT OF A REDEFINED REGION
622
STORE INPUT AS SPATIAL OBJECT META DATA
624
AGGREGATE INFORMATION INTO NEW GROUPINGS BASED UPON THE SPATIAL OBJECT META DATA
626
DISPLAY INDICATORS FOR NEW GROUPINGS ON MAP
628
STOP

FIG. 6D

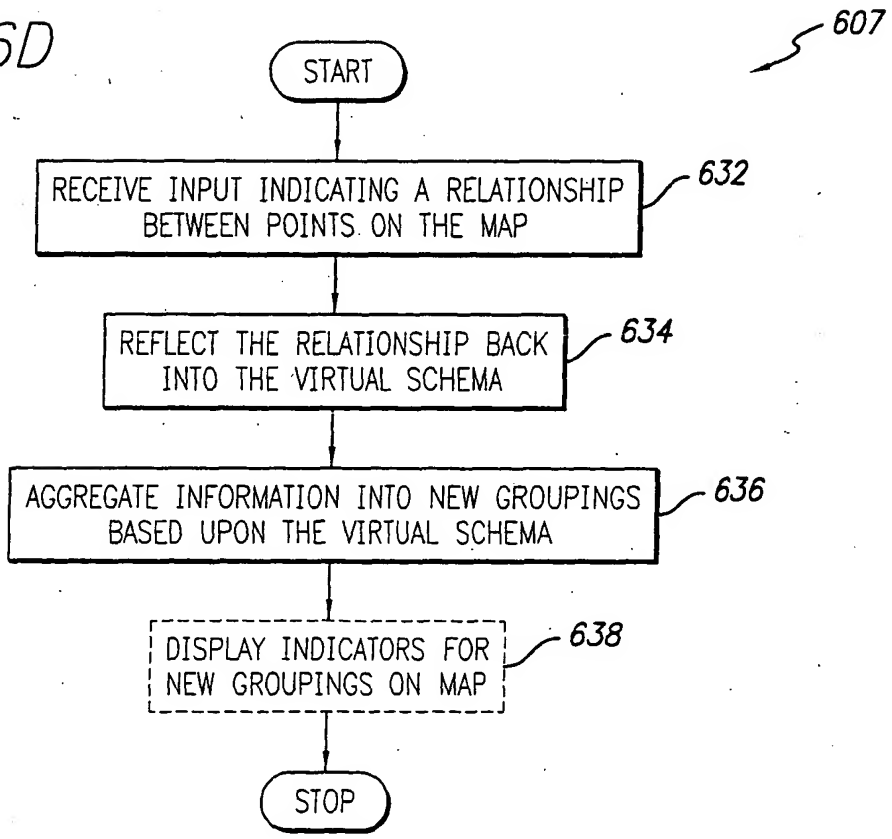
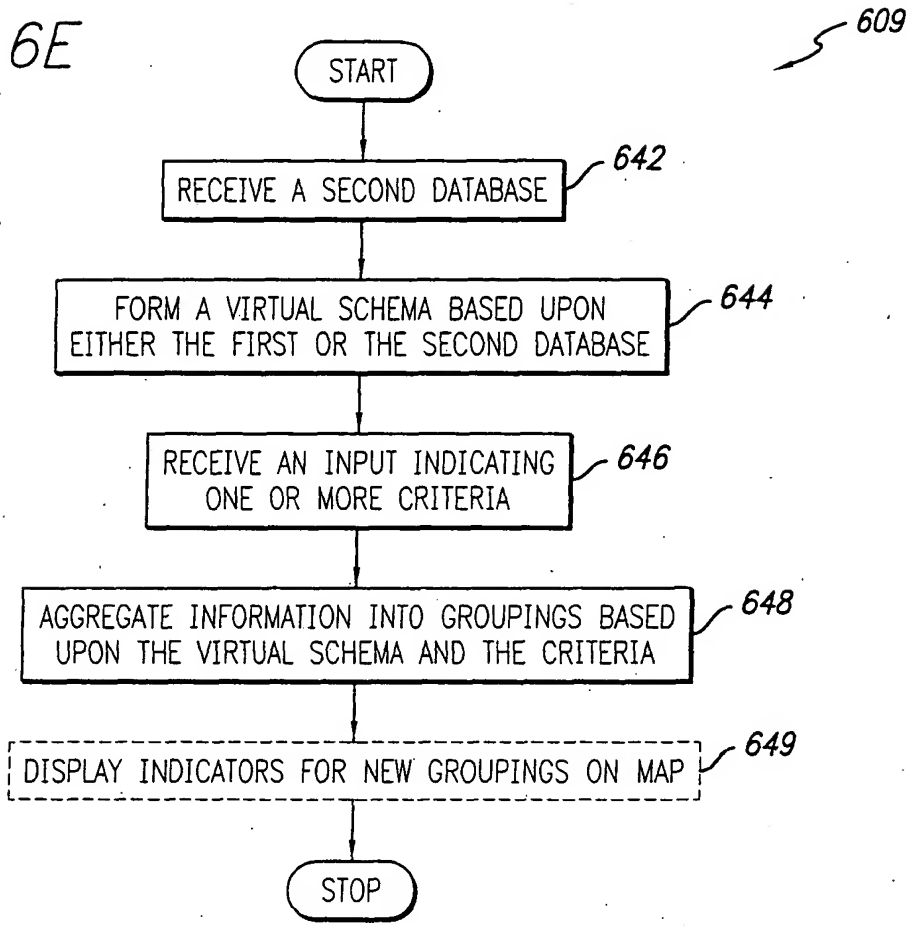

607
START
RECEIVE INPUT INDICATING A RELATIONSHIP BETWEEN POINTS ON THE MAP
632
REFLECT THE RELATIONSHIP BACK INTO THE VIRTUAL SCHEMA
634
AGGREGATE INFORMATION INTO NEW GROUPINGS BASED UPON THE VIRTUAL SCHEMA
636
DISPLAY INDICATORS FOR NEW GROUPINGS ON MAP
638
STOP

FIG. 6E


609
START
RECEIVE A SECOND DATABASE
642
FORM A VIRTUAL SCHEMA BASED UPON EITHER THE FIRST OR THE SECOND DATABASE
644
RECEIVE AN INPUT INDICATING ONE OR MORE CRITERIA
646
AGGREGATE INFORMATION INTO GROUPINGS BASED UPON THE VIRTUAL SCHEMA AND THE CRITERIA
648
DISPLAY INDICATORS FOR NEW GROUPINGS ON MAP
649
STOP

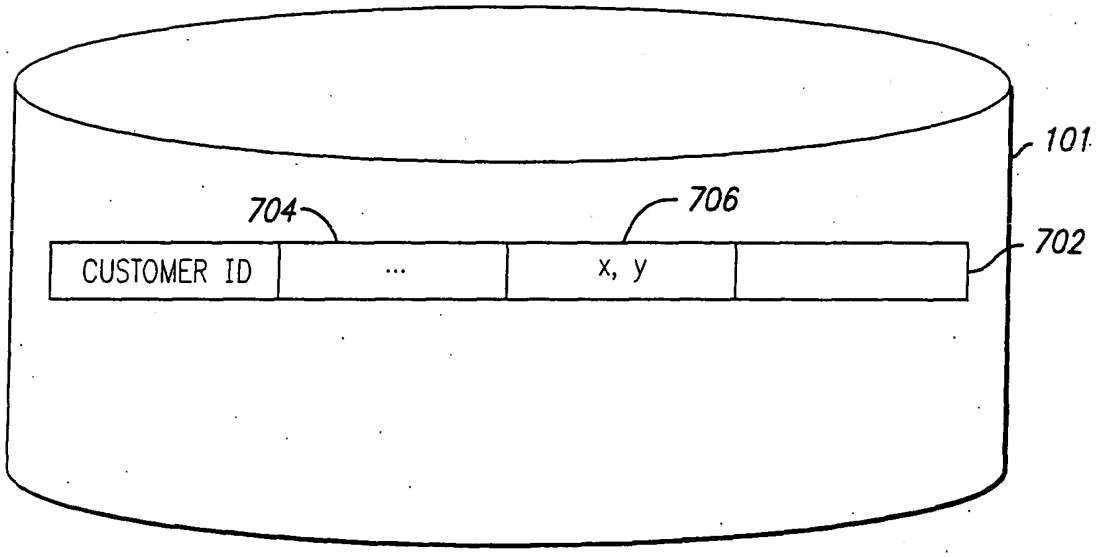

101
704
706
CUSTOMER ID
...
x, y
702

FIG. 7

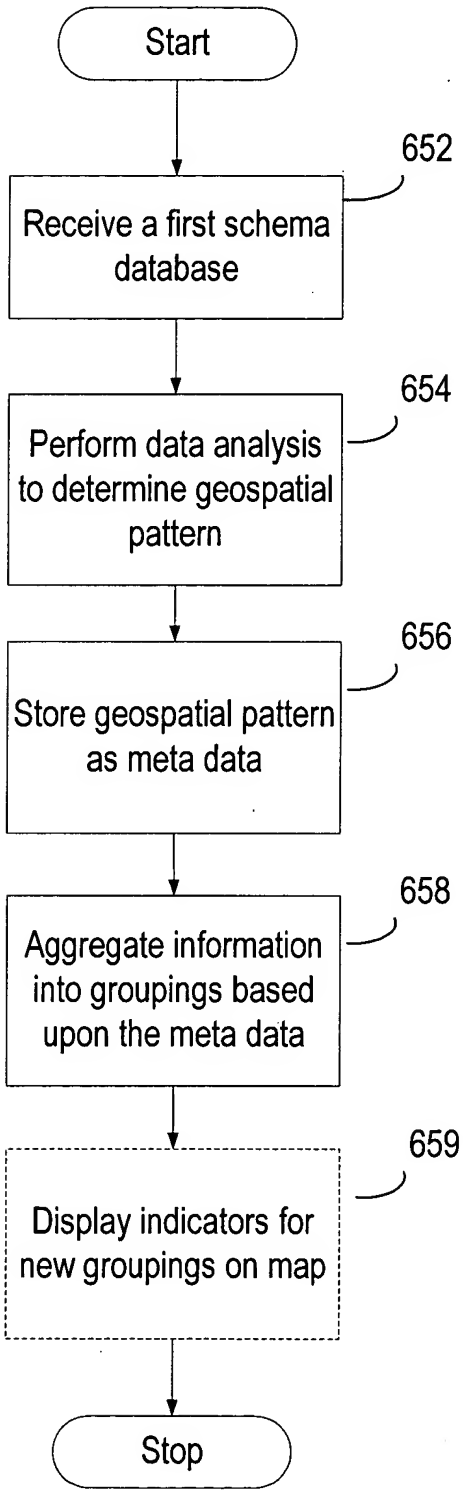

Start
611
652
Receive a first schema database
654
Perform data analysis to determine geospatial pattern
656
Store geospatial pattern as meta data
658
Aggregate information into groupings based upon the meta data
659
Display indicators for new groupings on map
Stop

Fig. 6F

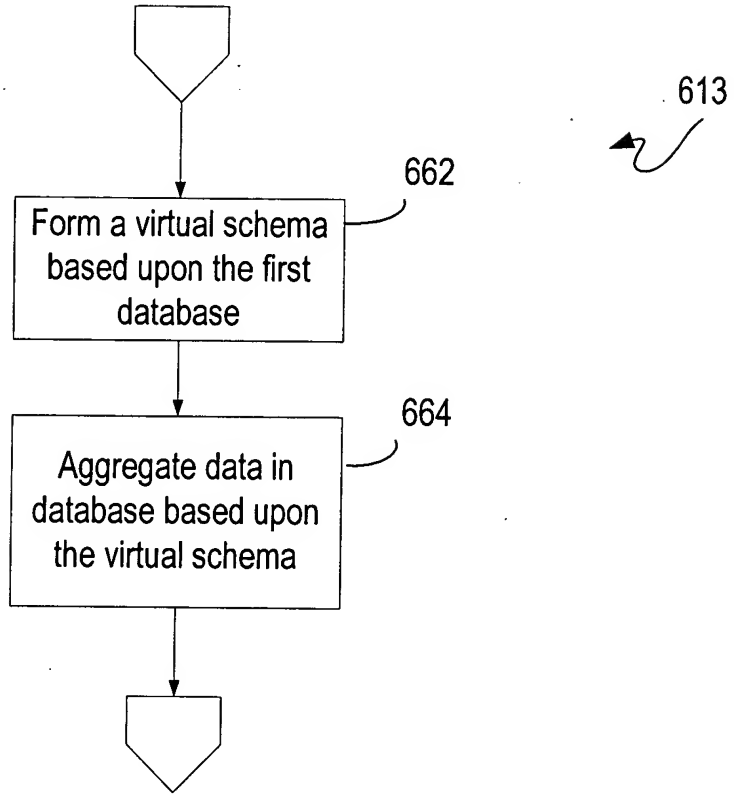

613
662
Form a virtual schema based upon the first database
664
Aggregate data in database based upon the virtual schema

Fig. 6G

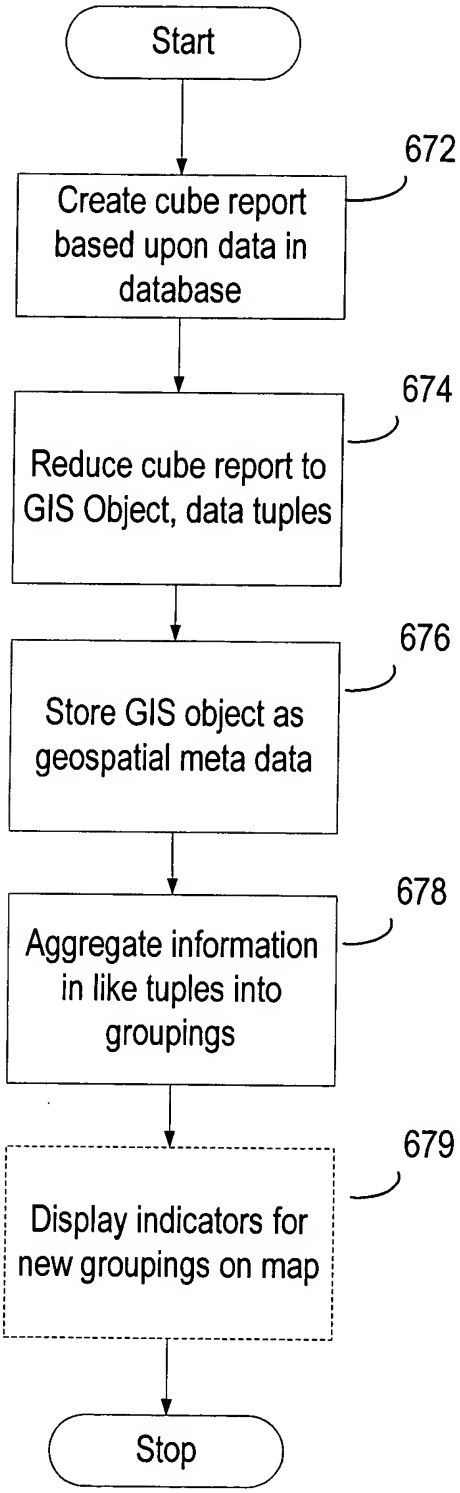
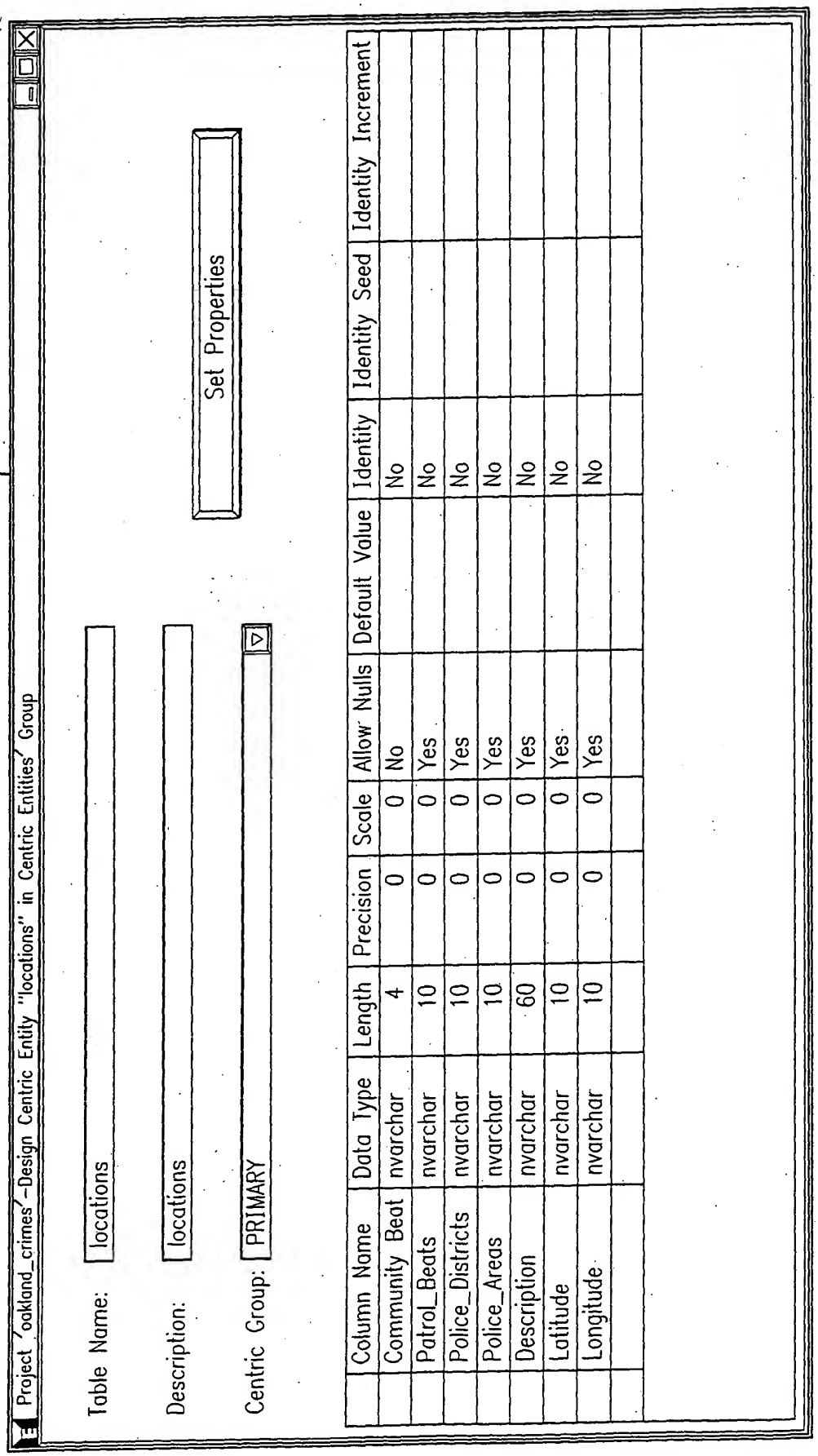

Start
615
672
Create cube report based upon data in database
674
Reduce cube report to GIS Object, data tuples
676
Store GIS object as geospatial meta data
678
Aggregate information in like tuples into groupings
679
Display indicators for new groupings on map
Stop

Fig. 6H

FIG. 8


802
Project 'oakland_crimes'-Design Centric Entity "locations" in Centric Entities' Group
Table Name: locations
Description: locations
Centric Group: PRIMARY
Set Properties
Column Name | Data Type | Length | Precision | Scale | Allow Nulls | Default Value | Identity | Identity Seed | Identity Increment
Community_Beat | nvarchar | 4 | 0 | 0 | No | | No
Patrol_Beats | nvarchar | 10 | 0 | 0 | Yes | | No
Police_Districts | nvarchar | 10 | 0 | 0 | Yes | | No
Police_Areas | nvarchar | 10 | 0 | 0 | Yes | | No
Description | nvarchar | 60 | 0 | 0 | Yes | | No
Latitude | nvarchar | 10 | 0 | 0 | Yes | | No
Longitude | nvarchar | 10 | 0 | 0 | Yes | | No

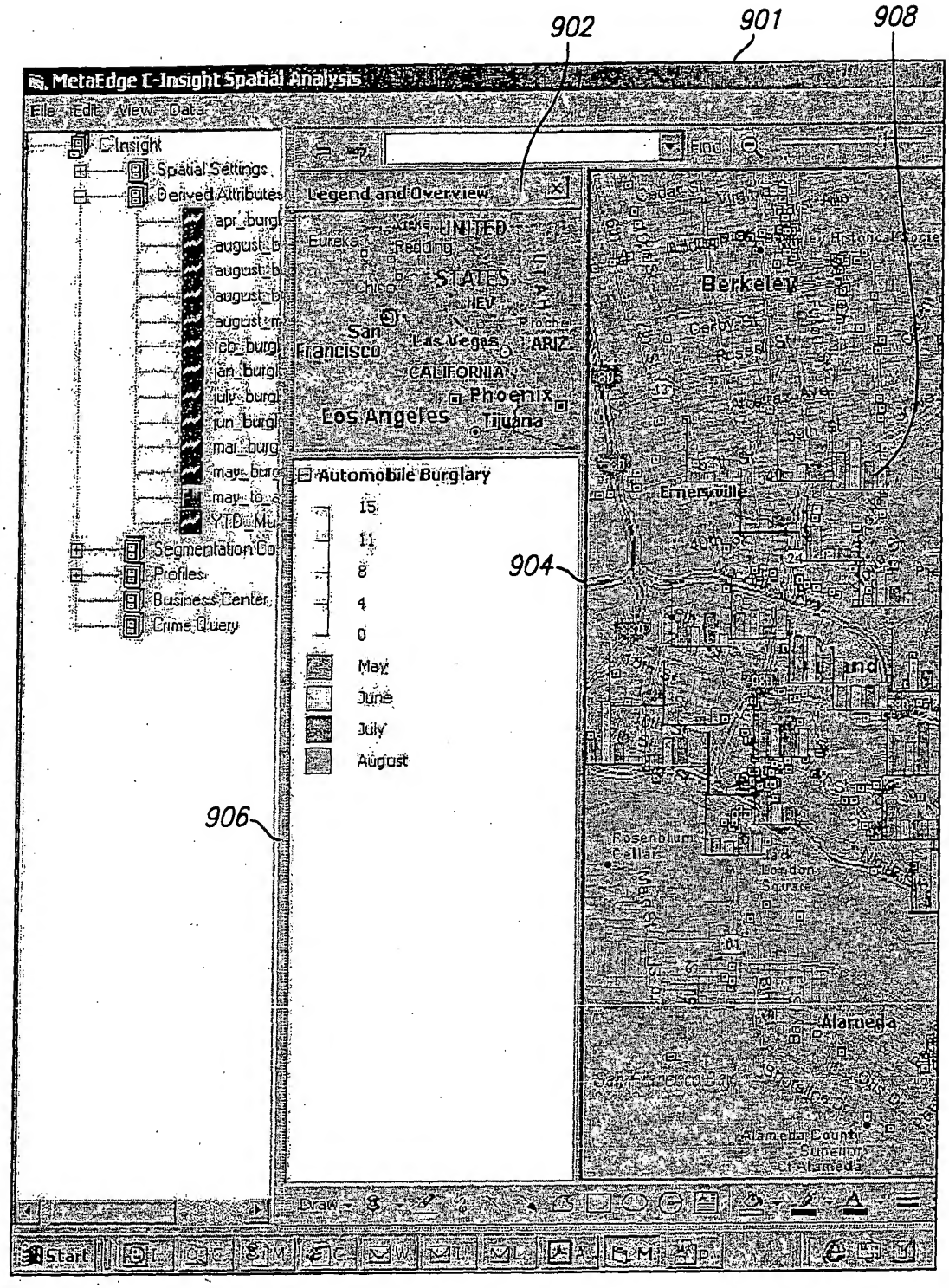

902
901
908
MetaEdge C-Insight Spatial Analysis
File Edit View Data
C-Insight
Spatial Settings
Derived Attributes
apr_burgl
august_b
august_b
august_b
august_b
august_m
feb_burgl
jan_burgl
july_burgl
jun_burgl
mar_burgl
may_burg
may_to_c
YTD_Mu
Segmentation Co
Profiles
Business Center
Crime Query
Legend and Overview
Automobile Burglary
15
11
8
4
0
May
June
July
August
904
906
Find
Berkeley
Emeryville
Alameda
Draw
Start

FIG. 9A

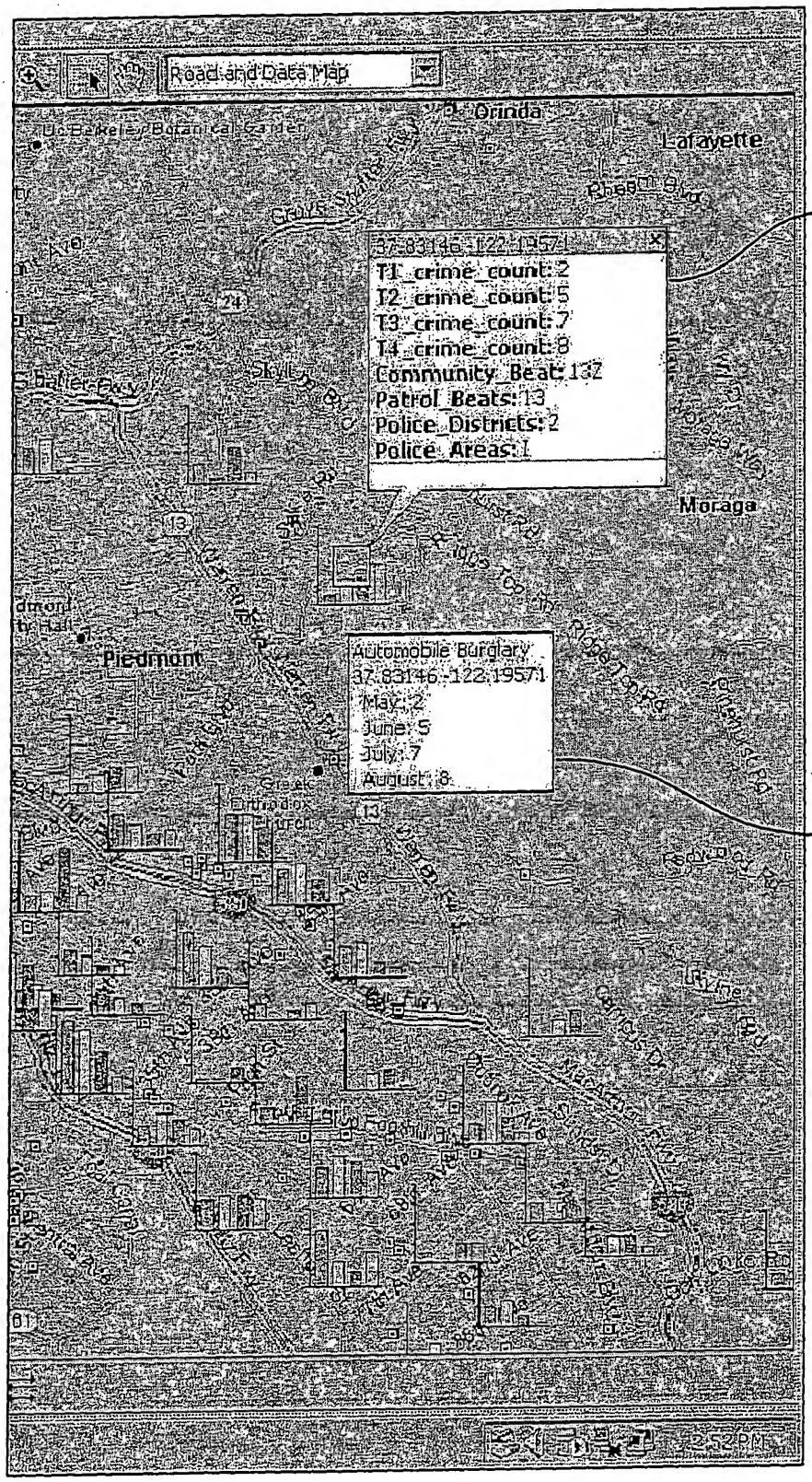

Road and Data Map
Orinda
Lafayette
Moraga
Piedmont
37.83146,-122.19571
T1_crime_count:2
T2_crime_count:5
T3_crime_count:7
T4_crime_count:8
Community_Beat:13Z
Patrol_Beats:13
Police_Districts:2
Police_Areas:1
Automobile Burglary
37.83146,-122.19571
May: 2
June: 5
July: 7
August: 8
910
912

FIG. 9B

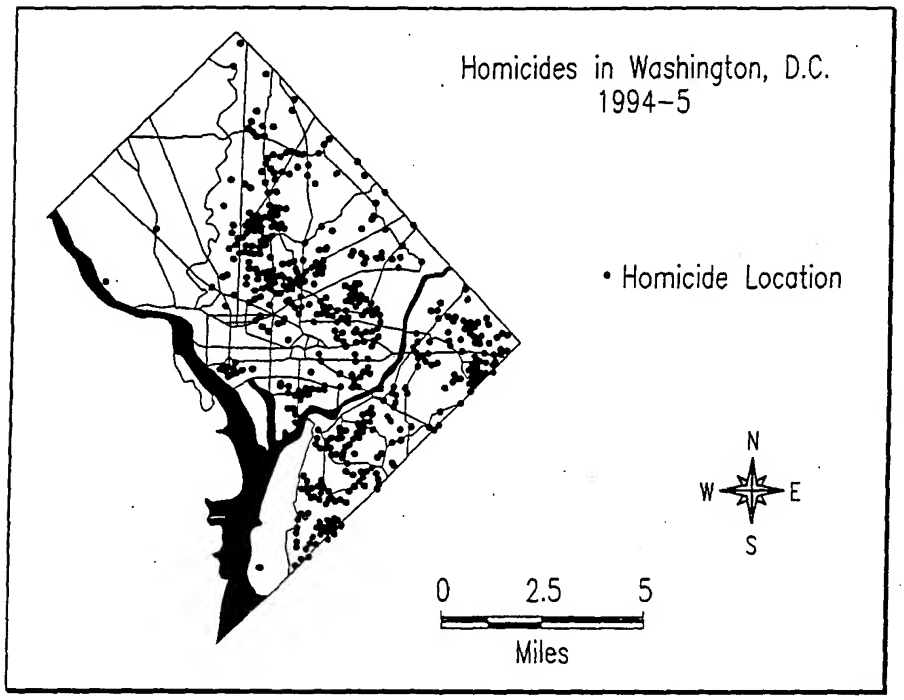

Homicides in Washington, D.C.
1994–5
• Homicide Location
N
W
E
S
0
2.5
5
Miles

FIG. 10

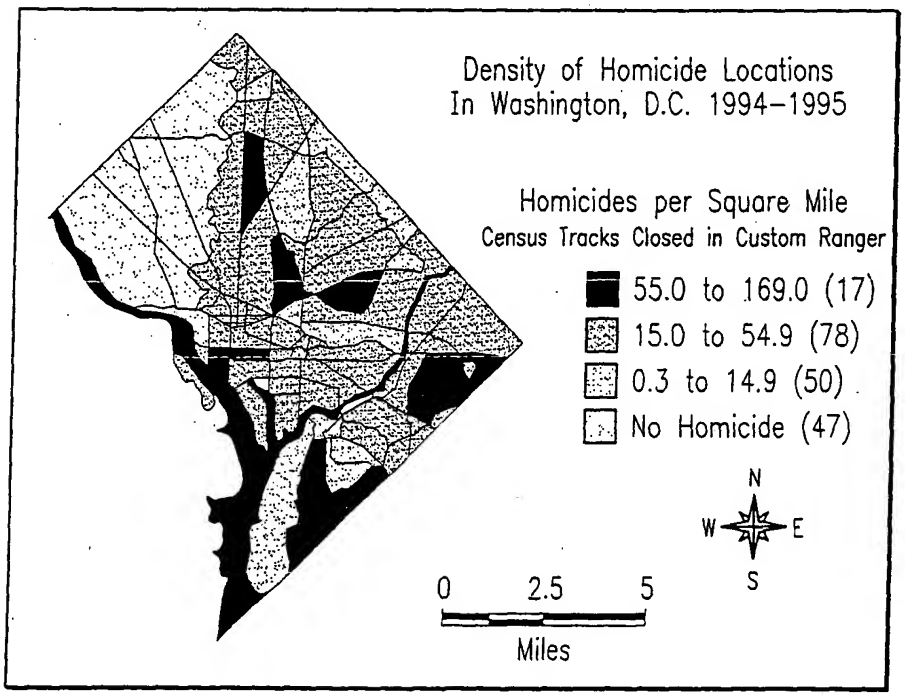

Density of Homicide Locations
In Washington, D.C. 1994–1995
Homicides per Square Mile
Census Tracks Closed in Custom Ranger
55.0 to 169.0 (17)
15.0 to 54.9 (78)
0.3 to 14.9 (50)
No Homicide (47)
N
W
E
S
0
2.5
5
Miles

FIG. 11

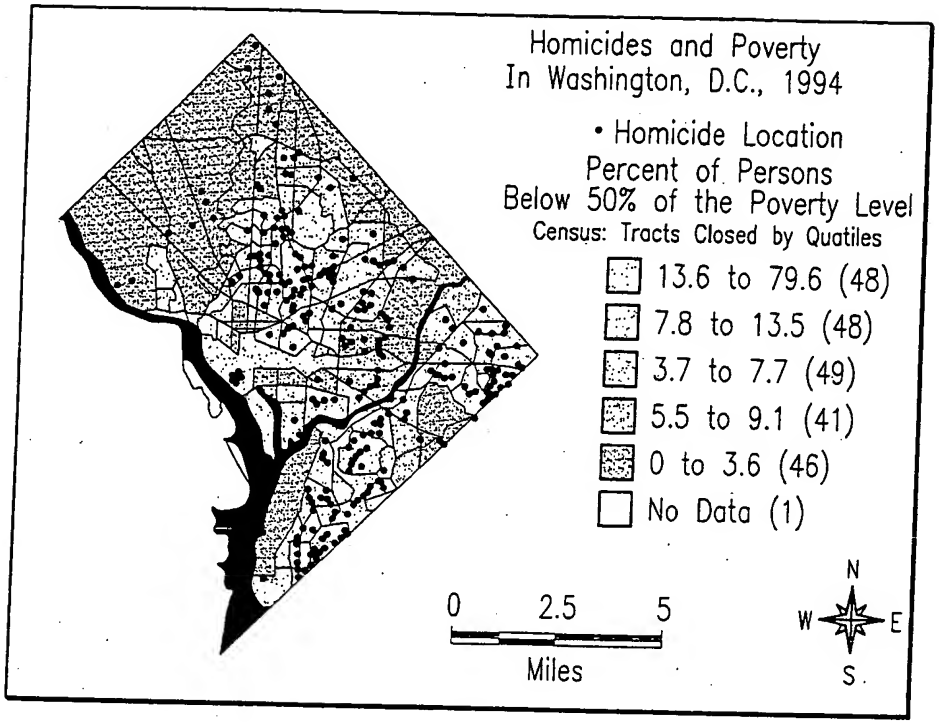

Homicides and Poverty
In Washington, D.C., 1994
• Homicide Location
Percent of Persons
Below 50% of the Poverty Level
Census: Tracts Closed by Quatiles
13.6 to 79.6 (48)
7.8 to 13.5 (48)
3.7 to 7.7 (49)
5.5 to 9.1 (41)
0 to 3.6 (46)
No Data (1)
0 2.5 5
Miles
N
W
E
S

FIG. 12

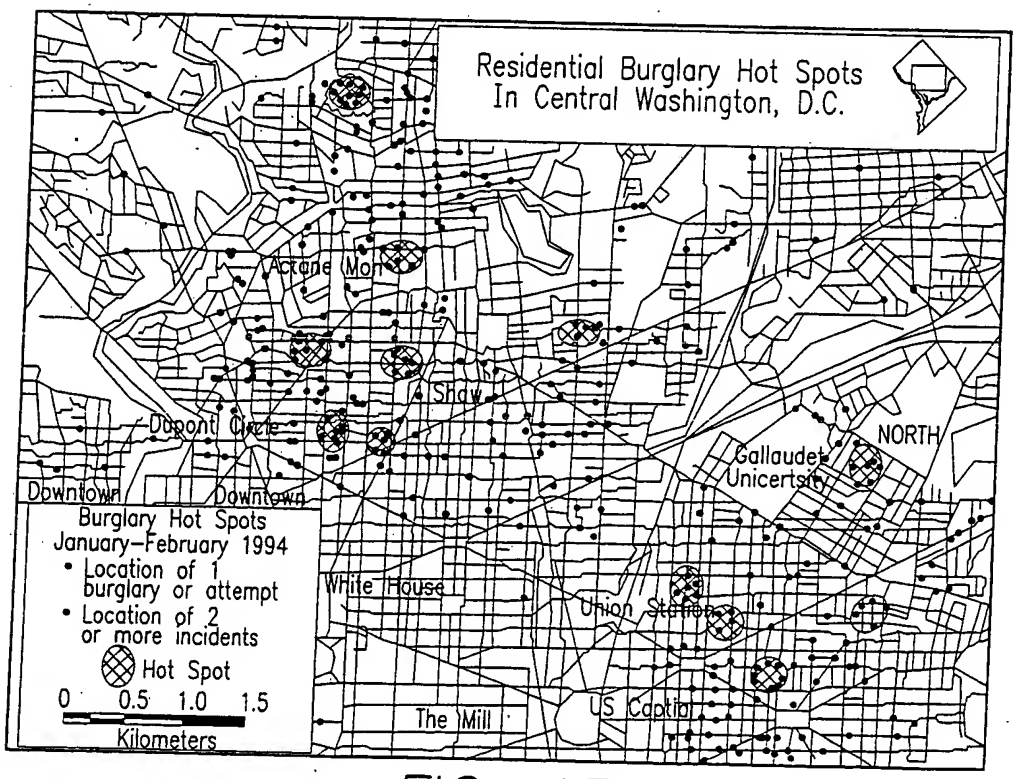
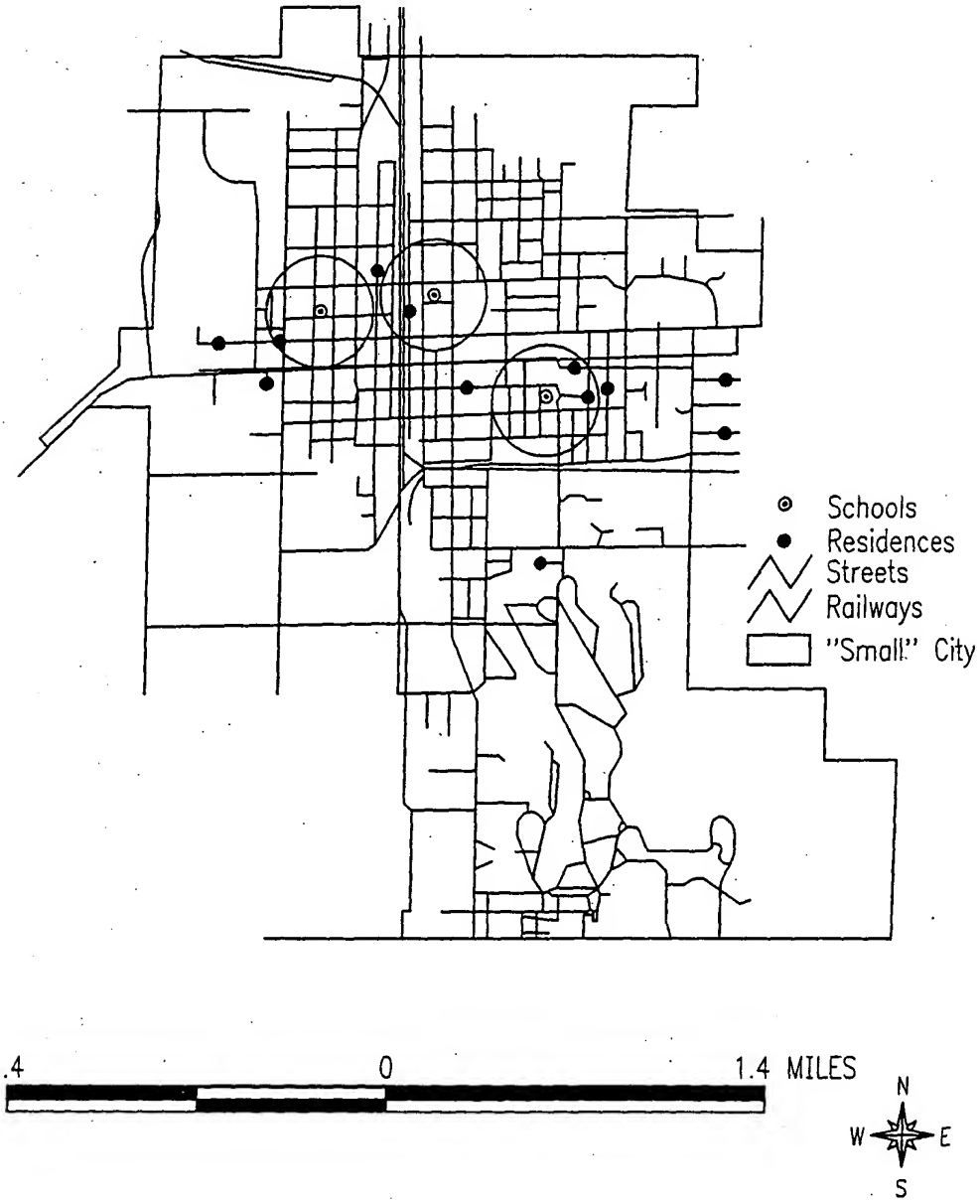

Residential Burglary Hot Spots
In Central Washington, D.C.
Adams Mor
Shaw
Dupont Circle
Downtown
Downtown
NORTH
Gallaudet
Unicertsity
White House
Union Station
The Mill
US Capitol
Burglary Hot Spots
January–February 1994
• Location of 1 burglary or attempt
• Location of 2 or more incidents
Hot Spot
0 0.5 1.0 1.5
Kilometers

FIG. 13

REGISTERED CHILD SEX OFFENDER
REPRESENTATION "SMALL " CITY



SOURCE: FAIR COUNTY LAW ENFORCEMENT AGENCIES
NOTE: THE BUFFER CONTAINS 1000FT OF THE AREA

FIG. 14